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Allcock, Bronwyn Anne

2016

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Allcock, Bronwyn Anne (2016) Unzoo: creating conservational conscience - a progressive development scheme for Johannesburg Zoo, University of Witwatersrand, Johannesburg, < http://wiredspace.wits.ac.za/handle/10539/22006>

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UNZOO

Creating Conservational Conscience

A Progressive Development Scheme for Johannesburg Zoo

by

Bronwyn Allcock
M.Arch (Prof) 2015

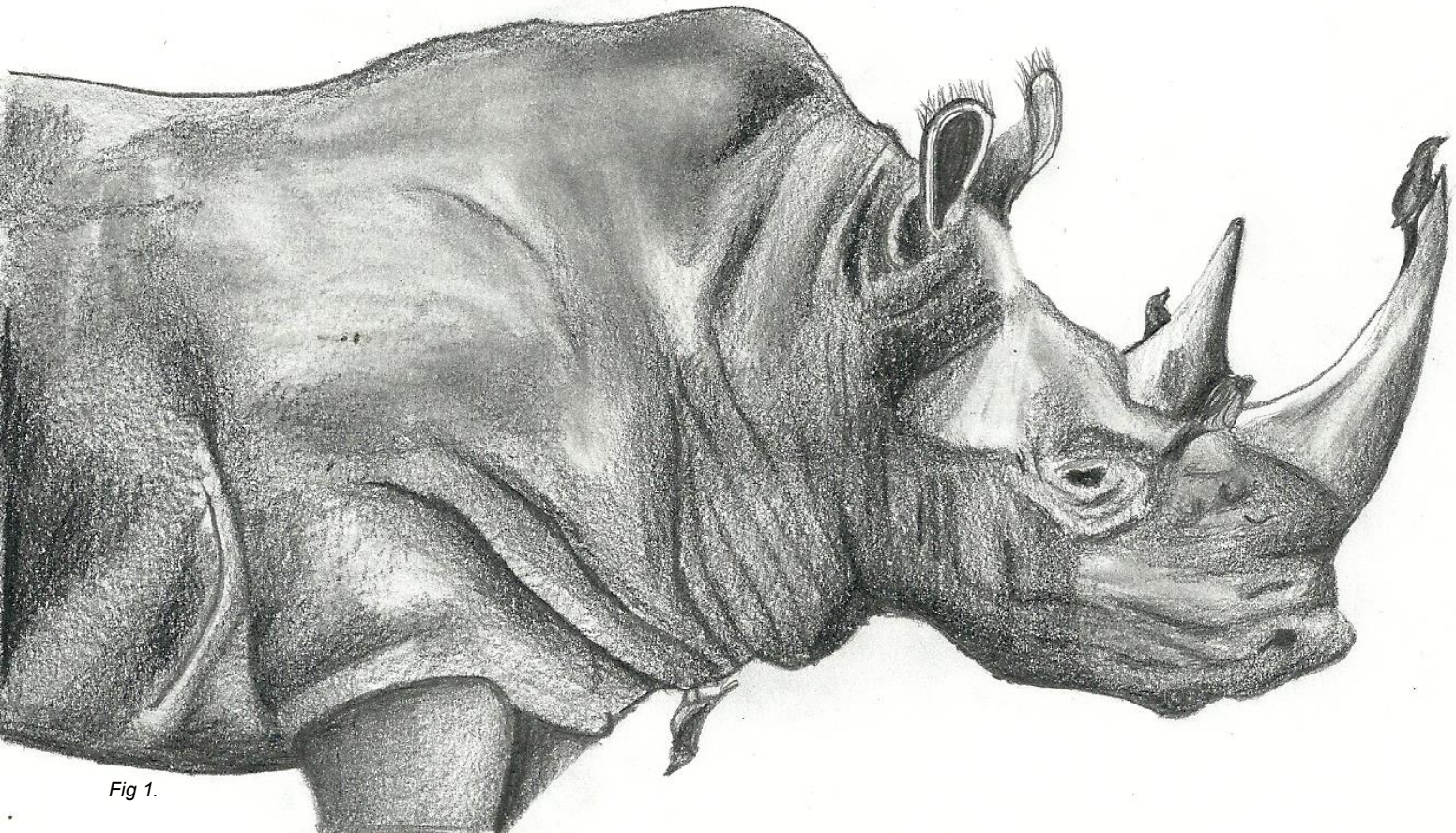

Fig 1.

ABSTRACT

Humans and animals have a diverse and complex set of relationships but their inextricable narratives of development leave them interdependent. By understanding the human fascination with other living beings, in conjunction with our responsibility of preserving the planet, the importance of human-animal interaction becomes apparent. Acknowledgment that understanding the role played by animals in society, ancient and modern, goes far beyond biology, introduces ideas of culture, association and imagination as key contributing elements to the forging of meaningful relationships between man and beast. Zoological gardens, as an architectural typology, are a fundamental platform for human-animal interaction and an important link in the chain of conservation. Their development over time illustrates a reflection of human thought and highlights the typology as a powerful tool in the establishment of an environmental conscience. A redefinition of the role of the modern zoo causes us to critically analyse the experience of animal spectatorship; learning about animals aids us in learning about ourselves. Understanding the complexities of both people and animals can expose common ground, through which we can educate ourselves and improve our abilities to create a better environment for animals, and in so doing perhaps also for ourselves.

This thesis proposes a redevelopment scheme for a portion of Johannesburg Zoo; creating a transition from the traditional colonial zoological garden model to an urban ecological destination, in line with contemporary conservational thought. Through understanding the historical, topographical and functional layering that conglomerates the existing Johannesburg Zoo, the design prioritises a sensory architectural experience: liberating zoo animals from cages and altering the physical and psychological viewpoint of the spectator.

DECLARATION

I, Bronwyn Anne Allcock, 360695, am a student registered for the course Master of

Architecture [Professional] in the year 2015. I hereby declare the following:

I am aware that plagiarism [the use of someone else's work without permission and/or without acknowledging the original sources] is wrong. I confirm that the work submitted for assessment for the above course is my own unaided work except where I have stated explicitly otherwise. I have followed the required conventions in referencing thoughts, ideas, and visual materials of others. For this purpose, I have referred to the Graduate School of Engineering and the Built Environment style guide. I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my unaided work or that I have failed to acknowledge the source of the ideas or words in my own work.

Bronwyn Anne Allcock
13 January 2016

This document is submitted in partial fulfilment for the degree:

Master of Architecture [Professional] at the University of the Witwatersrand, Johannesburg, South Africa, in the year 2015.

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Introduction

Animals and Boundaries

The Zoological Garden

What are we Looking at?

01 | Theoretical Underpinnings

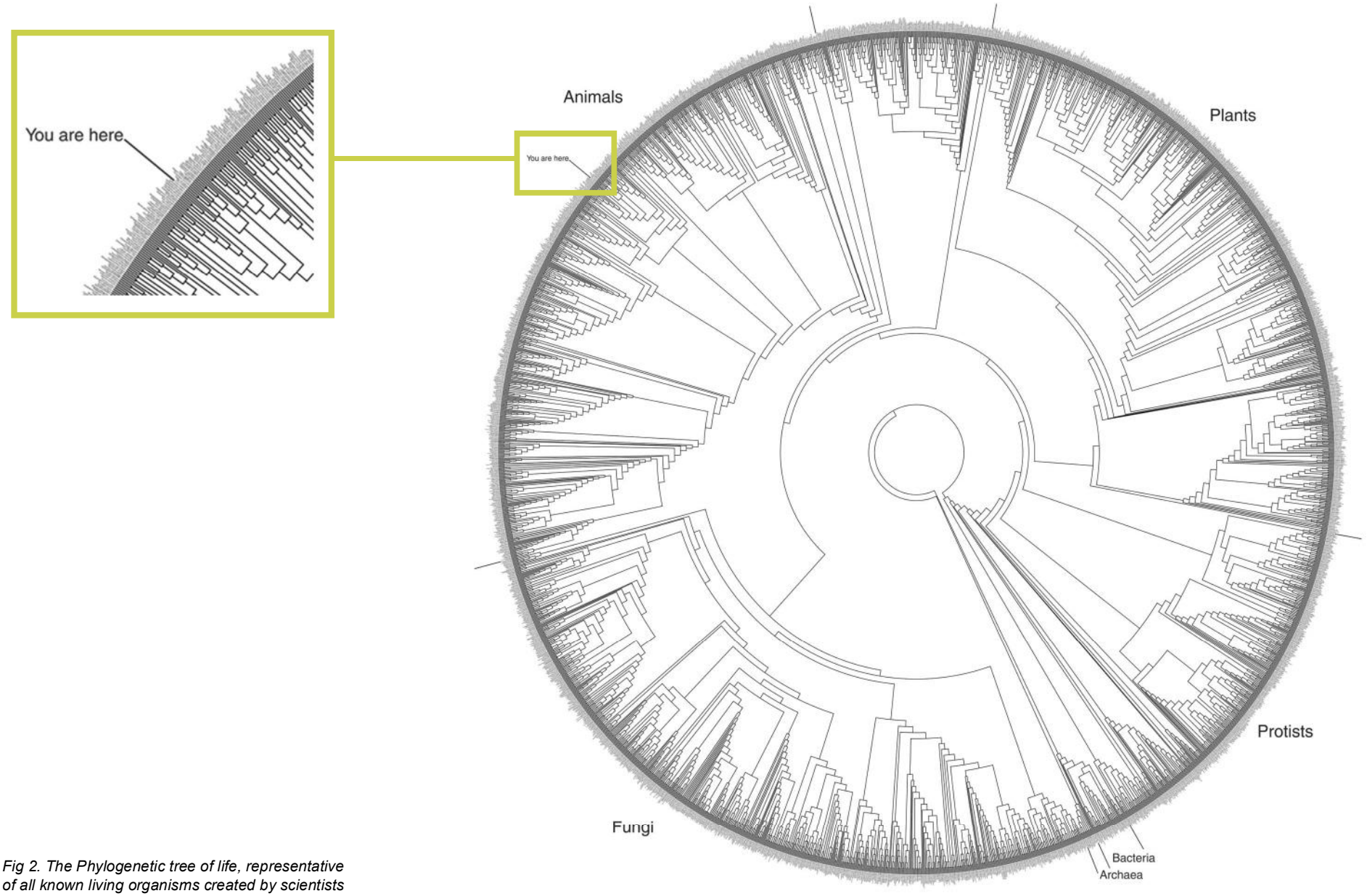


Fig 2. The Phylogenetic tree of life, representative of all known living organisms created by scientists David Hillis, Derreck Zwickl, and Robin Gutell to describe evolutionary relationships of various species. UT/Austin, School of Biological Sciences

INTRODUCTION

The human intrigue with animals has been around since the beginning of time – be it out of fear, fascination or a desire for control. There was a time when people and animals existed equally on this earth, each free to roam and survive in their own right. As humans have emerged as the planet's dominant species so too have we enforced restrictions on all that exists around us, slowly tailoring the environment to suit our own needs. In so doing we have severely damaged the natural progression of many animal species – some irreplaceably so. The greatest ethical problem faced by man at present has been described as deciding on the extent to which we can alter the natural world (Sax, 2001). As we sit in this privileged position of control, it is our responsibility to ensure the survival of all that exists around us for future generations. We ourselves are natural beings, and are required to acknowledge our place in the greater network of living things, "by definition, the practice of conservation requires that one species assumes responsibility for the entire earth and all other species" (Joffe, 1969 p42). This interdependance between humans and animals, that we have created as a result of exerting our authority on the natural landscape, leaves a huge scope for initiatives of ecological restoration.



Fig 3, Remaining 'wild'spaces dedicated to animals, www.ewf.org.za

ANIMALS AND BOUNDARIES

Stages of the Cage

The definition of *Wild* as defined in the Oxford Dictionary, refers to an animal or plant living or growing in the natural environment, not domesticated or cultivated; as well as a place or region that is uninhabited, uncultivated or inhospitable. This considered, there are very few places left on earth that can be considered truly 'wild'. For generations man has taken pride in his ability to master his often hostile environment (Joffe, 1969). By nature, animals will settle in an environment that serves their needs, when this ease of existence is no longer possible, they will move on to find a new environment; allowing resources to replenish and maintaining a dynamic range of comfort. In contrast, humans have settled in chosen areas and exploited those areas causing irreparable damage with no intention of moving on. Myrdene Anderson describes humans to be, "caught up in Edens and Armageddons" (Sebeok, 1991), implying that we are so focused on the past and the future that we tend to neglect the present and ignore the implication of our current actions. The expansion of human population has for centuries only prioritised the needs of people; consequentially the 'left-over' spaces allocated to animals are sporadic, separated and minimal. We have encroached so far into the natural environment that even the compartmentalised remains of animal species in the 'wild' rely on our interference for survival.

The preservation and management of wildlife is approached through three different channels. These are namely the act of according wildlife with legal protection – creating legal distance between them and the interference of humans; the enclosure of animals, on a variety of scales, encapsulating both the animals and their habitats into areas which can be supervised and managed and lastly the removal of animals from their natural habitats to breed in captivity and supplement the natural progression of species (Joffe, 1969).These three methods of conservation are embodied by the typologies of the ecological museum, the nature reserve and the zoological garden respectively (Manicom, 2011). Contrary to intention, when analysed, all three of these typologies hold man at the centre, the zoological garden perhaps exposes this most prevalently and is the topic of further inquiry for this thesis.

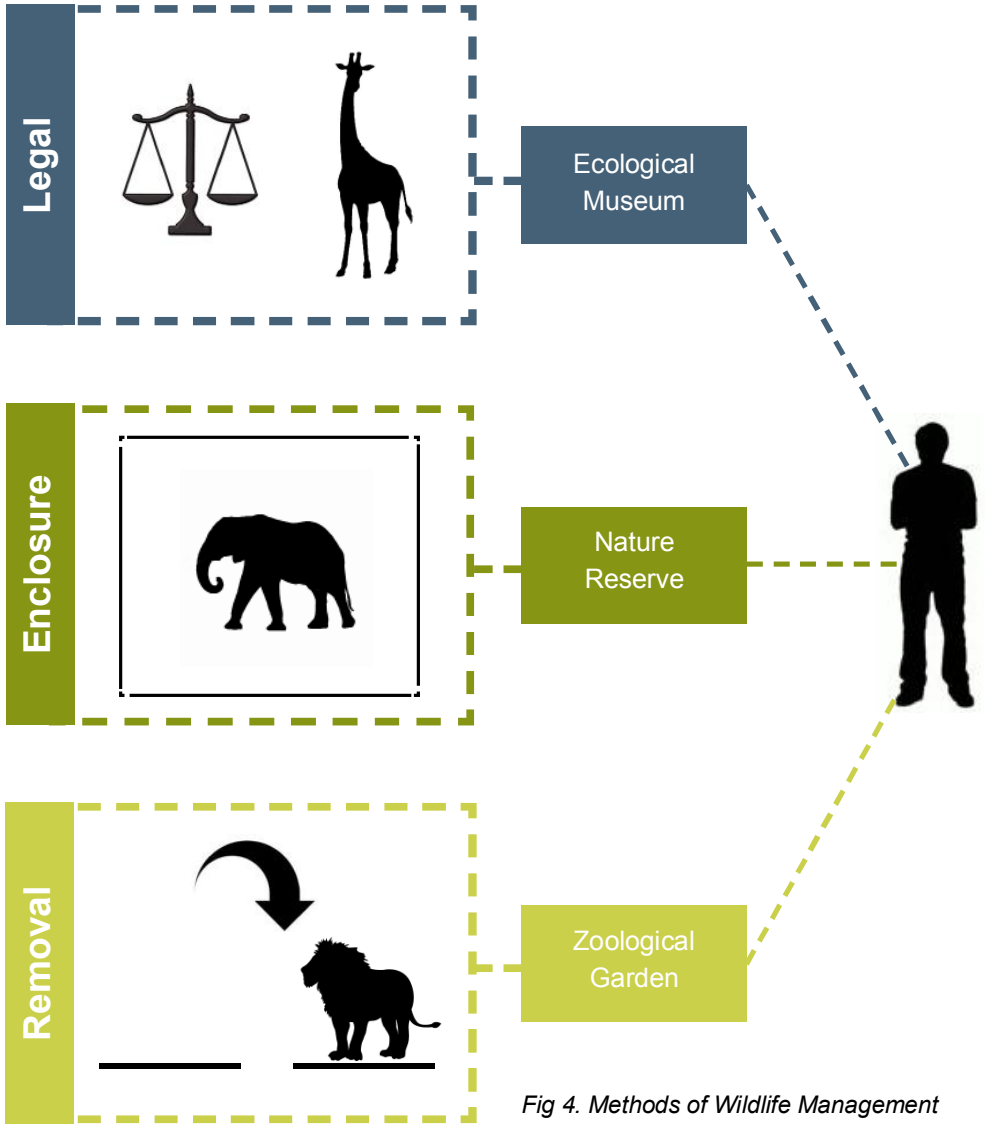


Fig 4. Methods of Wildlife Management

Human Interaction with Animals

People have a rich and varied history of relationships with animals, throughout history these diverse relationships have helped to shape the progression of the human species and the creation of the modern world, “They are part of our epic tales. They are part of the grand narrative of domestication and the transformation of human existence through agriculture. They often have represented nature in religious and scientific thought” (Ritvo, nd). Human-animal interaction varies from the purpose of food to sport, relationships as companions, entertainment and education. Animals have taken on central roles in culture, religion and mythology and have developed symbolic relevance varying from war symbols to tokens of friendship. (Mithen, 1999)

The human relation with animals dates back to the earliest understanding of hunter-gatherer communities, this interaction was primarily based on the instincts of survival and progressed through stages of protection, representation, hunting, the formation of tools and clothing and eventually led to the early acts of domestication. Even from these early interactions associations of fear, compassion and value began to become packaged with the image of certain living beings.

In many parts of today’s world, human-animal interaction is so ingrained into daily living that we hardly take notice of it. Many households, rich and poor, have pets which they interact with on a daily basis, but wild animals, seen only in zoos and on pricey vacations, are becoming more of a fictional idea than a reality to many city dwellers. Without making a conscious effort to expose oneself to wildlife many people will go their whole lives without fully experiencing the richness of the world’s natural diversity. It is to such people that conservation propaganda and pleas fall on deaf ears – with no relation to, or experience of wild animals it becomes difficult to empathize with their struggles.

Domestication

A certain tension has always existed between humans and animals. This is perhaps a result of the observation that people and animals were at one time seen as being on a par. Both had to compete for survival in the same environment and until one emerged as the dominant and authoritative species an element of hostility was to be expected. For this reason centuries passed with very little consideration given to the survival of animals, they were seen as competitors and enemies; which in some cases across northern Africa resulted in entire species being killed off (Joffe, 1969). Until enough human power could be exerted to render the animals useful, they served no real purpose other than food.

Approximately 9000 years ago, the period known as the Neolithic Revolution saw a fundamental shift in the relationship between man and his environment. This period saw man’s first attempts at farming as well as the domestication of some of the wild animals which had previously only been hunted (Joffe, 1969). “Out of the multitude of animal forms, mankind had succeeded in selecting a few that could be employed as religious symbols, hunting companions, helpers in the fields, providers of meat and wool, and as riding or pack animals. Animals became gods and at the same time capital” (Wendt, 1959 p5).

The twentieth century saw the development of the internal combustion engine which negated the role of animals in transport. Through continued technological advancements animals became less and less useful to society and on a large scale they were discarded. What remained were the personal relationships that had been formed between humans and animals during this time; as a result animals were kept, despite their lack of functional purpose, as companions and for recreation.



Fig 5, Ancient cave painting of a presumed cheetah, Karoo, South Africa, author’s own



Fig 6, Illustration of a Koisan hunt, The wild sports of Southern Africa, Harris,W.C



Fig 7, Horse drawn wagon, www.nps.gov



Fig 8, man walking pet dog www.xbow.com

Zoology and Catergorisation

Understanding zoology is perhaps the clearest way through which to understand man's relationship with animals. Defined as, "The scientific study of the behaviour, structure, physiology, classification, and distribution of animals" (Oxford English Dictionary) tracing the origins of zoology as a science begins to inform us of the complexity of human-animal relationships.

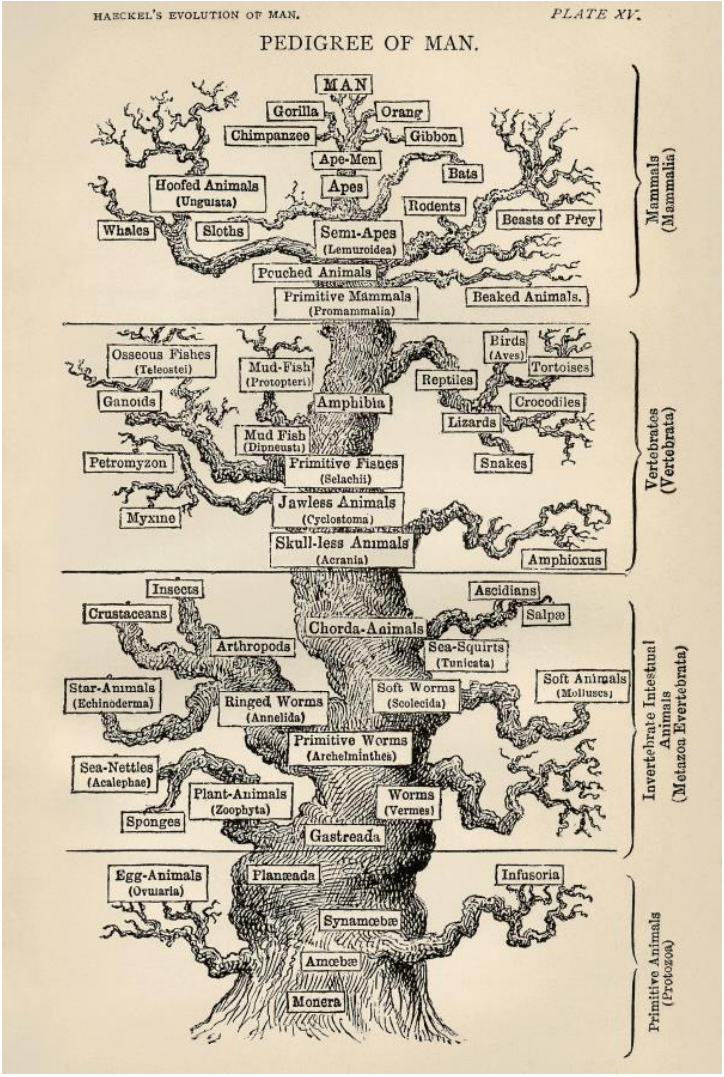


Fig 9, Illustrated interpretation of Aristotle's classification of species www.andrewyang.com

As previously mentioned through the introduction of human interaction with animals, people became familiar with the animals existing in their surroundings. It was when man ventured out of his immediate surroundings and discovered new creatures with which he was unfamiliar that curiosity came to the fore. Initially in the form of myths and stories, accounts of these foreign beings led to further intrigue and catalysed the earliest intent to further understand animals. "Both curiosity and the tendency to create myths have lived on into our own day, and run like a red thread through the history of zoology" (Wendt, 1959 p4).

Even the earliest cave paintings show evidence of observation, an attempt to understand the subject, which has through generations remained the primary focus of zoology. As man's scope of reference grew so did his intrigue, answers led to further questions and the beginning of an infinite cycle of investigation. Humans have throughout the course of history made attempts to categorise and classify all living beings (Wendt, 1959). Aristotle, who can be argued as the world's first natural historian, wrote extensively on animal physiology and his work was considered authoritative in the field for centuries after his death (Fitzgerald and Kalof, 2007). In his book, The History of Animals, he proposed fixed categories of beings (the first introduction of the idea of species) these categories were allocated a hierarchical order, with humans at the top and insects at the bottom. This acknowledges the complex psychological co-existence of animals and humans for the first time, suggesting concepts of evolution and framing people as an unchallenged priority. In the centuries that followed, animal collections became increasingly prevalent, satisfying the endless intrigue with the exotic.

It becomes evident through this tracking of academic growth in the field of zoology that the link between culture and science (with regards to animals) cannot be separated. One stems from the other, connecting missing links and forming an inextricable narrative of the development of society. Upon closer inspection understanding animal history provides us with a revealing consideration of society, one learns equally as much about people as about animals through zoology, ranging from man's initial curiosity through the captivation of exotic creatures to our current rescue attempts for endangered species through modern zoos. "The way we perceive animals illuminates our own values, concerns, and aspirations" (Belozerskaya 2006).

THE ZOOLOGICAL GARDEN

History of Zoological Gardens

Zoological gardens, or zoo's, become an important tool in facilitating interaction between people and animals, particularly in an urban setting. They facilitate personal encounters between people and wildlife that would otherwise never occur – in this way they can be considered a kind of fantastical living gallery. This, over and above the vital role they play in conservation through breeding programmes and rehabilitation, begins to justify their purpose.

Zoos have a long history that has left them tarnished in the public eye. Their earliest traces have been found to originate out of Royal Menagerie's; private collections of exotic animals that were kept as symbolic representations of power. Royal and Imperial leaders from all around the world, particularly Egypt, Asia and parts of Europe, confined animals to cages for their own viewing pleasure. These animals were not species that would be found in the local surrounding context but rather intriguing new discoveries that were found on expeditions and brought back for their foreign qualities of enthrallment. The diversity and comprehensiveness of one's collection was directly associated with one's wealth and power.

The early 17th century saw the founding of the world's oldest public zoological gardens in Europe and Russia. In 1795 a zoo was founded inside the Jardin des Plantes in Paris with animals from the Royal Menagerie at Versailles. The focus here changed from purely a demonstration of power and wealth to scientific research and education. This institution became the archetype for many zoological gardens around the world, Johannesburg Zoo, established in 1907, initially fell into this classification of zoo era.

The modern zoo, as we are familiar with it today, only came about in the early 19th Century as a result of scholarly research and a demand for public entertainment, the primary examples of these being in London, Dublin and Paris. The animal wellbeing was, until this point secondary to the satisfaction of human desires. Zoo's began to be considered as part of the urban frameworks of open public spaces and became integrated into the recreational framework of cities creating what can be referred to as, "an oasis of captured nature". (Steiner. 2003)

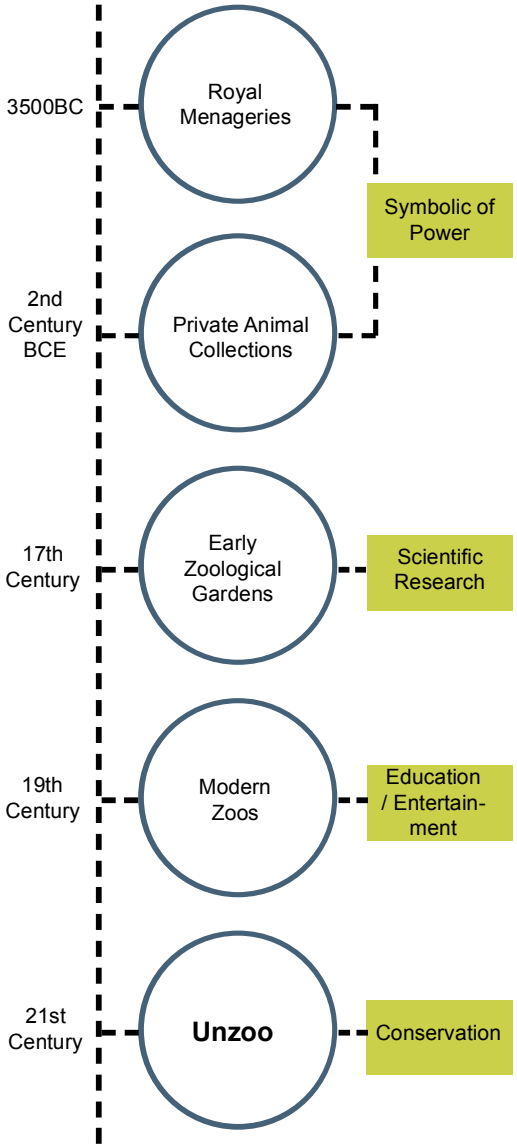


Fig 10, progression of zoos and intention

It was only in the 1970's that ecology really emerged as a topic of public interest and the focus of zoos shifted once again seeing conservation take on a prominent role. This saw the development of the 'un-zoo' movement – an effort to minimalize cages and keep the well-being of animals at the highest priority. It was only from this point of departure that zoos such as the Bronx Zoo and Jersey Zoo began to recognise the role of the zoological garden typology as something that needed to serve both animals and people. The practice of making animals perform tricks was largely brought to an end and a greater consideration for the animals emerged.

With this historical understanding we are faced with the question of what comes next? As the list of endangered animals grows year on year, and we make further damage to the natural world, there is little more that the animals themselves can do. We are tasked with developing a conscience amongst humans as an international community in order to ensure the survival of the creatures of this world.



Fig 11, Tower of London, Royal Menagerie, www.fineartamerica.com



Fig 12, Animal artists at Jardin des Plantes, Paris, www.wikiedia.org



Fig 13, Elephant rides at Dublin Zoo in the 1950s, www.broadsheet.ie

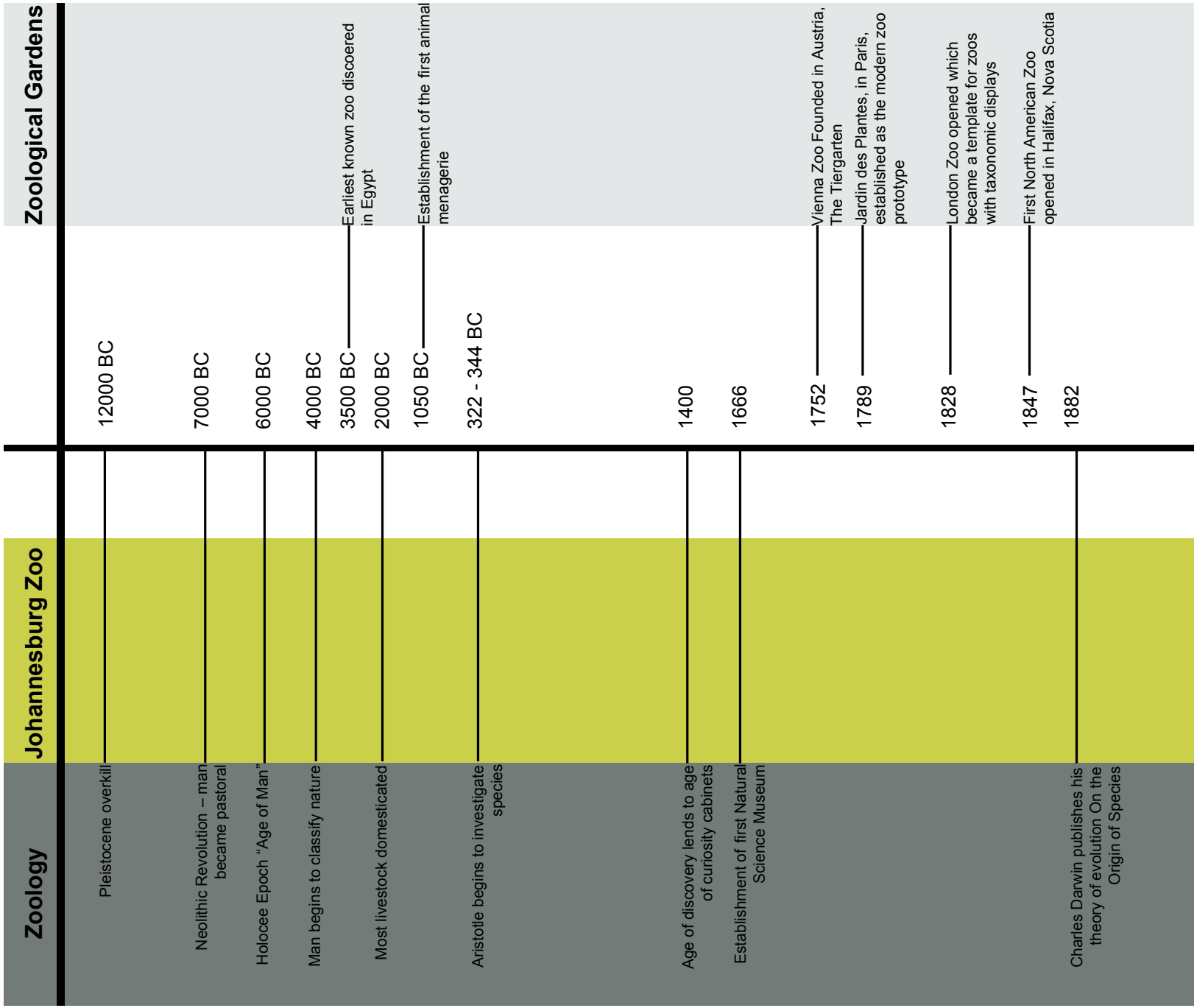


Fig 14, Giraffe enclosure at the Bronx Zoo, www.usmagazine.com

Zoological Timeline

This timeline tracks the progression of the Zoological Garden typology together with the history of Zoology as a science and the history of Johannesburg Zoo.

Through this comparative analysis one is able to see the three aspects are interconnected and responsive to one another which highlights the platform for 'What Comes Next' in a current context. Any future intervention in the field of Zoological Gardens needs to be responsive to, and in line with the current thinking in contemporary zoology and the progressions in zoological garden design.



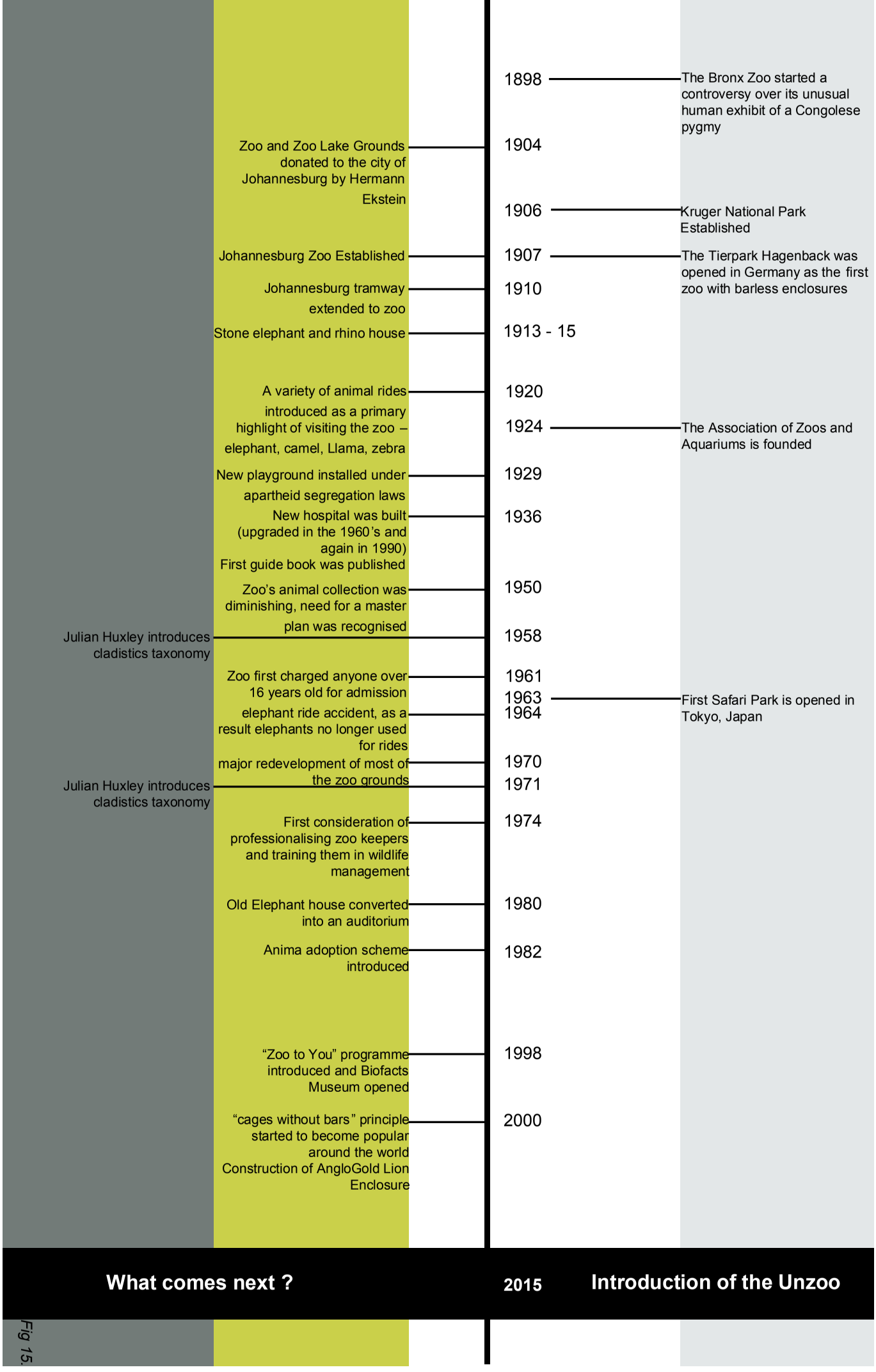

1898
The Bronx Zoo started a controversy over its unusual human exhibit of a Congolese pygmy
Zoo and Zoo Lake Grounds donated to the city of Johannesburg by Hermann Ekstein
1904
1906
Kruger National Park Established
Johannesburg Zoo Established
1907
The Tierpark Hagenback was opened in Germany as the first zoo with barless enclosures
Johannesburg tramway extended to zoo
1910
Stone elephant and rhino house
1913 - 15
A variety of animal rides introduced as a primary highlight of visiting the zoo – elephant, camel, Llama, zebra
1920
1924
The Association of Zoos and Aquariums is founded
New playground installed under apartheid segregation laws
1929
New hospital was built (upgraded in the 1960's and again in 1990)
First guide book was published
1936
Zoo's animal collection was diminishing, need for a master plan was recognised
1950
Julian Huxley introduces cladistics taxonomy
1958
Zoo first charged anyone over 16 years old for admission
1961
1963
First Safari Park is opened in Tokyo, Japan
elephant ride accident, as a result elephants no longer used for rides
1964
major redevelopment of most of the zoo grounds
1970
Julian Huxley introduces cladistics taxonomy
1971
First consideration of professionalising zoo keepers and training them in wildlife management
1974
Old Elephant house converted into an auditorium
1980
Anima adoption scheme introduced
1982
"Zoo to You" programme introduced and Biofacts Museum opened
1998
"cages without bars" principle started to become popular around the world
Construction of AngloGold Lion Enclosure
2000
What comes next ?
2015
Introduction of the Unzoo

Fig 15.



Fig 16 - Illustration of the imaginative filter through which people view animals

Relevance of Animals in Society

"The diverse habits of man's behaviour, no matter how complex or specialised, are all mirrored in the activities of the other animals with which we share this planet"(Hancocks, 1971 p9). Understanding the biology and scientific aspects of the animal kingdom is only one of the components which make up the relation and relevance of animal presence in human society. It is easy to slip into modern scientific thought and view animals merely as, "repositories of hereditary information" (Sax, 2001), but it is perhaps the underlying traditions, symbolism, cultural and personal associations with animals, that have been developed over hundreds of years, which truly define the ability of humans to interact with animals.

The names which animals bear carry intricate expectation and assumption (Sax, 2001). The term Lion for example, exceeds the simple reference to Panthera Leo as a biological being. The name carries with it associations of grandeur and courage and the symbolic interpretation of the animal is commonly one of kingliness, particularly in religion and art. This symbolism and association allows humans to connect with animals on a far deeper level than pure scientific fact would. Knowledge of such traditions and symbolic relevance makes the act of viewing animals (especially in situations such as zoos) one that occurs through a cultural or imaginative filter. This makes the spectatorship experience incredibly more complex on an emotional level and as a result more meaningful for the viewer. It is the same reference and memory which allows little girls to see frogs as princes instead of slimy green amphibians that creates an intimate relationship that would not otherwise exist.

These associations and memories are derived from myth, legend and literature that have been developed over generations. The resultant traditions and associations have themselves been required to be dynamic to ensure their continuity – adjustments are made sensitively and the core relation between human and animal remains unchanged. Although there is an endless scope of animal association in human society some of the most documented and influential as documented by Boria Sax in Animals as Tradition, are:

Metamorphosed animals: found mainly in tribal societies as totems used to trace ancestry and often imitated in dances and rituals. These animals are admired, respected or feared dependant on historical observation.

Divine animals: creatures which are worshipped like gods and portrayed with great care and reverence. Examples of these are cats and ibises in ancient Egypt and still today cows which are deemed as holy in the Hindu faith. Human gods and goddesses across a diversity of beliefs are often portrayed with an animal mascot, for example Athena pictured with an owl, elevating the animal to the revered status of the anthropomorphic figure.

Demonic animals: animals believed to symbolise evil and bad luck. The devil is often portrayed with the horns of a bull, the teeth of a wolf, the tusks of a boar and the legs of a goat – all of these depictions translate into associations with the animals themselves. Links between animals and witchcraft also led to the emergence of superstitions, some of which people still believe in today.

Satiric Animals: these are creatures whose characteristics have been highlighted through fictional narrative, for example the fables of Aesop portray a variety of animals in ways with which humans can easily relate, resulting in the inseparable character and behavioural associations made between humans and certain animals.

Political Animals: this refers to the similarities drawn between animal behaviour and human behaviour. The likening of people's actions to that which one could expect from particular animals creates an associative stereotype for certain animal species.

Although the ancient rituals linked with metamorphosed, divine and demonic animals have changed and adapted with modern society, the fear, respect, suspicion and love initiated by ancient tradition is still prevalent in the cultural beliefs of today's world. The acknowledgment of such tradition and association leads us to question through conservation efforts, what exactly it is that we are preserving. Both in the wild and in captivity associating animals with tradition can help to induce an element of respect. Through broadening the scope of conservational focus to include cultural animal associations together with the physical biological existence of the creatures in question, a very powerful platform for the facilitation of emotional human-animal interaction is made available.



Fig 17, Traditional North American Totem pole symbolic of animal spirits and heritage www.123rf.com



Fig 18, Image of a demi-god cat, worshipped in Egyptian mythology www.lifesciencefiction.blogspot.co.za/



Fig 19, illustration of Aesops fable, the tortoise and the hare www.en.wikipedia.org

Animals and Architecture

A large amount of what man has learnt about building, he has learnt through the observation of animals. For use of one's natural environment, improvisation and functional specific construction there is no quality equivalent to the animals who build nests, dens, shelters and other habitats. The unique and intelligent processes utilised by a multitude of animal species redefine the organic aesthetic to something almost unattainable by man-made architecture. Hugh Casson, when admiring the architecture of animals states, "for elegance and precision, for structural ingenuity and powers of improvisation they are unbeatable – making even the best of human examples seem comparatively clumsy or contrived" (Hancocks, 1971 p7). Their expertise is not doubted, but relies of the availability of their natural environment. Having brought so many animals into our own charge through the destruction of their natural habitats or relocation to captivity we are now responsible for the creation of their habitat and comfort.

Experience of space, by either human or animal, is a result of a number of contributing factors, both tangible and of the mind. Both humans and animals alike choose to find territories that allow them to feel protected and comfortable (even though humans are more inclined to adapt a space until this is achieved). Our spatial experience greatly influences our mental state of mind and thus causes us to form associations, opinions and conclusions about the contributing experiential factors. Edward Hall expresses an opinion that, "it has long been believed that experience is what all men share, that it is always possible somehow to bypass language and culture and refer back to experience in order to reach another human being" (Hall, 1966 p 2). In the case of zoos, perhaps this experience becomes less about human beings reaching one another, but animals reaching human beings. If the spatial quality of zoo architecture can position both people and animals in an unthreatened and comfortable frame of mind, the experience of human-animal interaction can be accentuated and a platform from which humans can learn from animals is created.

Hancocks outlines the primary function of zoological gardens to be education on two separate and distinct levels: the first, to cause man to see that he does not exist in isolation in this world, and secondly, to teach an ethos of conservation – something that could not be possible through the iron cages of the original menageries (1971). In order for this to be possible zoos need to be designed to accommodate both the physiological and psychological needs of animals. The proposal of this thesis takes that a step further, encouraging the consideration of the physiological and psychological requirements of people into consideration as well. It is only through a duality of purpose that the built form can truly inspire interaction.

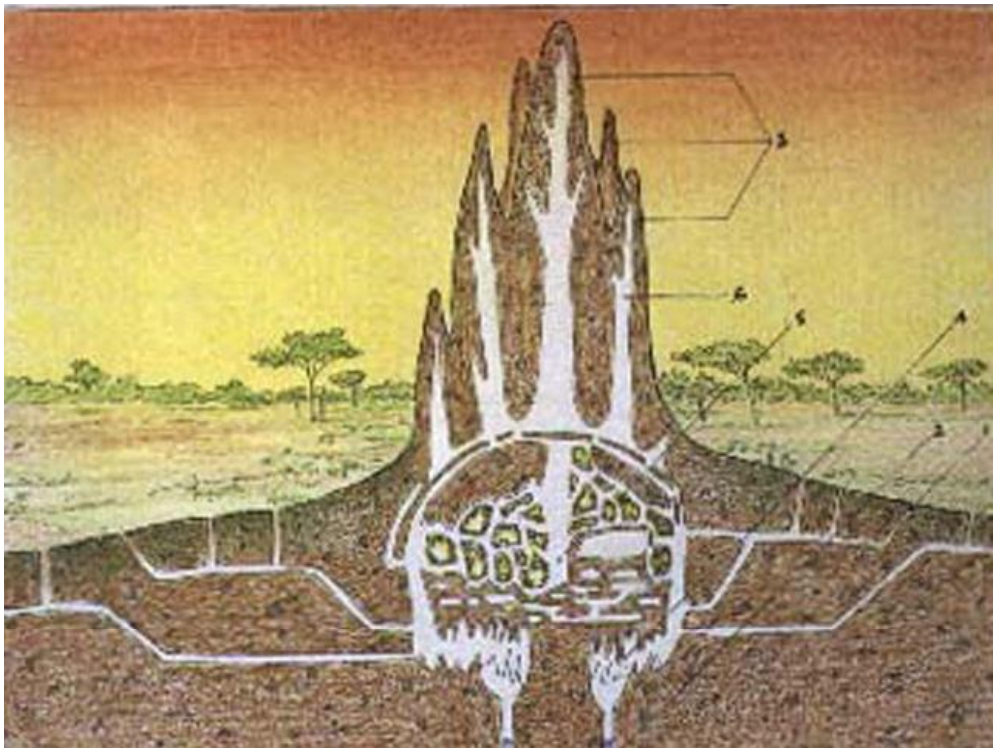
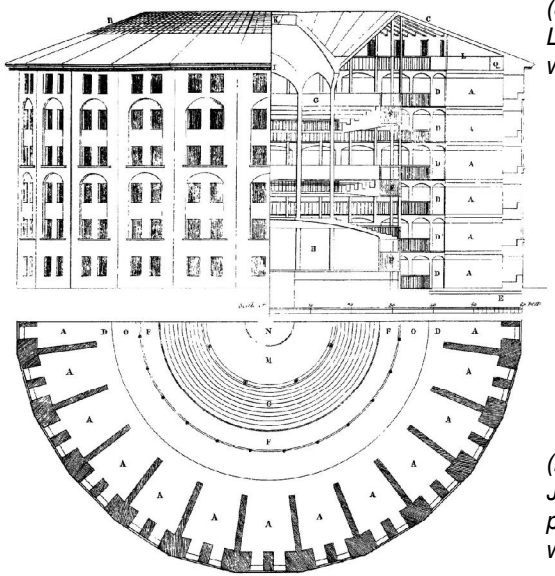


Figure 20,
Illustration of the natural cooling system of tunnels in a termite mound - one of the many architectural technologies learnt from nature.
www.londolozi.com

WHAT ARE WE LOOKING AT?



(above) Figure 21,
La Vaux's menagerie at Versailles
www. La-parisienne.npage.de



(left) Figure 22,
Jeremy Bentham's model for the panopticon prison
www.wikipedia.org

Viewpoint vs Point of View

The valuable role played by zoos in conservation is justified by science; the nature of the inquiry of this research therefore begins to question not whether or not animals should be viewed in zoos; but rather the manner in which this is done. Foucault likens the structure of traditional zoos to that of a prison – exercising power by surveillance. Something that becomes evident through further study of the plans of La Vaux's menagerie at Versailles and Jeremy Bentham's model for the panopticon prison (Malamud, 1998). In both cases the structure takes on the form of a radial plan centred around a tower intended as an all-seeing eye. This architecture emphasises the difference between the observer and the observed, empowering the spectator as authoritative and restraining the prisoner/animal through exposure. The Versailles menagerie was used as a template for the zoological garden typology and traces thereof can be found in the spatial structuring of many traditional zoos. As a result of this the spatial parameters for experience when visiting the zoo make it very easy for spectators to sit back into this authoritative position and not connect with the animals on an empathetic level. The architectural experience sets up the filter through which the animals are viewed.

If we consider a visit to the zoo as an aesthetic experience, we can consider what Kant (1911) suggests about the link between beauty and our imagination. He explains that the aesthetic is a product of our consciousness, in order to fully appreciate something we have to take it and imagine it as our own. It is only through allowing nature and animals to become an integrated part of our imaginations that we can develop an emotional connection with them. The creation, or in the cases of cultural reference, re-establishing this emotional connection lies at the heart of convincing people to be proactive about conservation.

It can therefore be suggested that it is in the interest of the greater purpose of zoos to utilise their very structure and spatial characteristics to position spectators in a way which will encourage the formation of intimate identification and relation as opposed to the traditional emphasis of authority.



Fig 23, An unlikely friendship between a boy and a bird; a rare bridging of the gap between reality and imagination, www.ego-alterego.com

Why do we look at animals?

The animals which we see in zoos are not always true reflections of the wild – through its definition the wild cannot be recreated, only imitated. Zoo animals are commonly rehabilitated animals that have been injured in the wild or animals that have been bred in captivity and would not be able to fend for themselves if returned to their natural environments. The artificial habitats are man-made recreations of foreign places that are difficult to identify with (Malamud, 2012) and this can cause zoo patrons to be left under a disconcerting veil of pretence. So why is it that people still visit the zoo?

Standing at the edge of a zoo enclosure, it is short sighted to expect to see something authentic. Although the animals are real and alive; the acceptance of the concept that one is the spectator of a culturally framed display is vital to the ability to find true benefit in the entire zoo typology. Perhaps we seek a fulfillment of fantasy, an experience of wilderness, only accessible through animals because we have destroyed our own. Or perhaps we look at animals to better understand ourselves, to experience our power and guilt, our fear and compassion. It is through animals that characters in our imaginations are given realistic bearing and we are reminded of cultural stories and lessons.

Randy Malamud, in his prologue entitled *Animals* to The Animals Reader explains that, “it’s troubling for human beings to not be able to exercise our epistemological powers, our imperial intellectual consciousness, over these creatures who are, according to the human fantasy expressed in the Book of Genesis, under our dominion” (Malamud, 2007). This begins to explain our complex intrigue as human beings with animal species. Our lack of totality in understanding animals keeps us returning time and time again.

It is only through allowing nature and animals to become an integrated part of our imaginations that we can develop an emotional connection with them.



Fig 24.

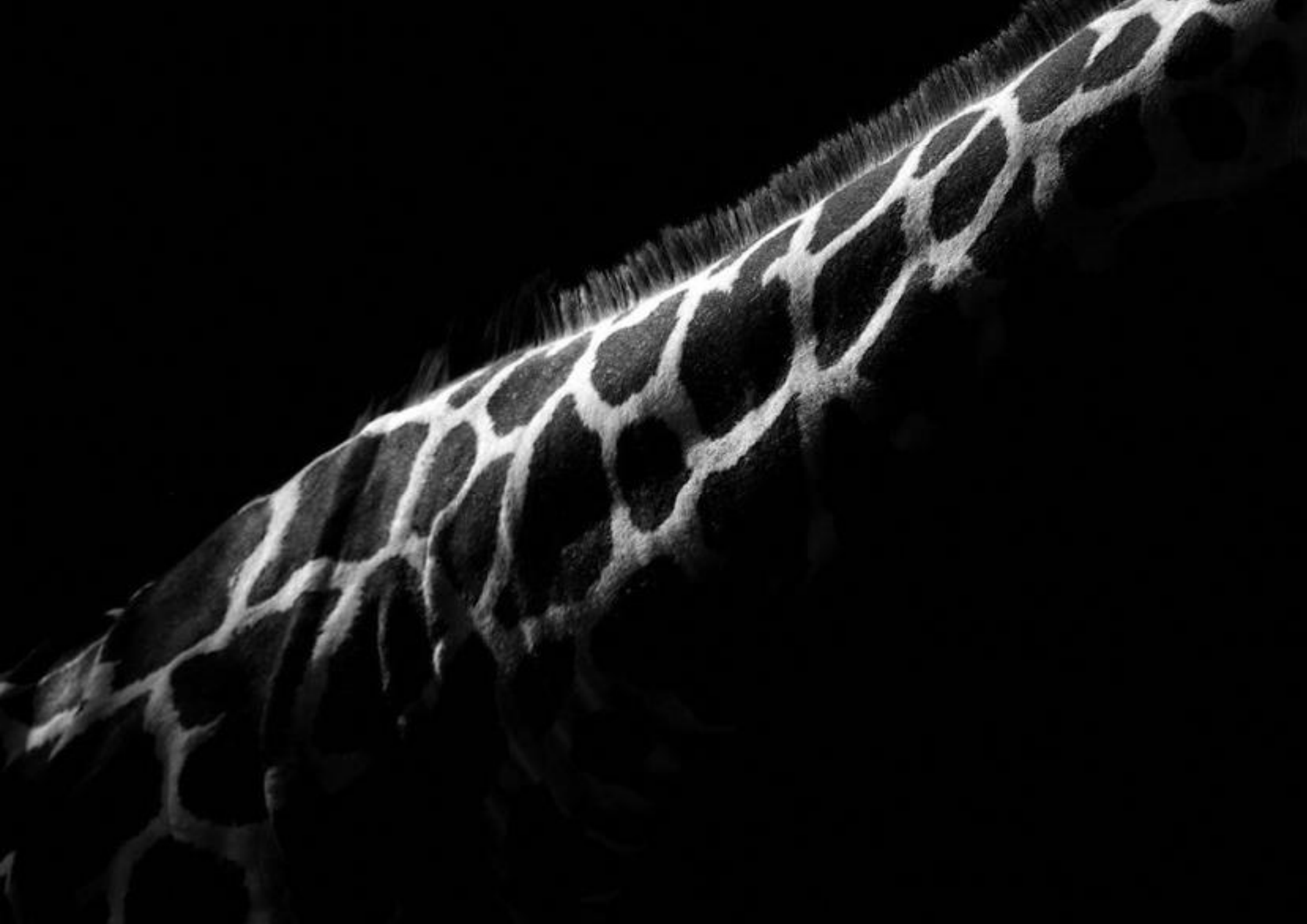


Fig. 25

In Conclusion

We live in a world dominated by artificial representation, “people are virtually trapped by a world of commodities and, more specifically, in a world where simulations of reality become dominant” (Dickens, 2004 p137). Wildlife seen on television becomes diluted by today’s endless channel selection. ‘The fight for the last rhinos’ is separated from ’15 minute dinner ideas’ by the push of a single button and as a result becomes equivalent in priority; unless an interest is forged elsewhere. Nature shows do not create the interaction necessary to establish emotional connections between man and animals (Malamud, 1998). With society so separated from our concept of the ‘wild’ it is only through real experience, facilitated to a certain degree by zoos, that a truly meaningful interaction between man and beast can occur.

The rarity of such interactions places highly weighted importance on the manner in which they occur, if zoos and conservationists hope to achieve any of their education based objectives. A person’s frame of mind upon entering a zoo, coupled with their cultural beliefs and imagination ultimately becomes as important to the conception of a pro-conservation attitude as the animals available for viewing. Architecture has the ability to become the mediating factor between these components; placing as much emphasis on the manipulation of humans as the protection of animals. Through spatial experience the sensory and emotional receptors of people can be awakened, reference to memory, explanation of fear and exposure to the meaning behind already accepted symbolism can position people in a psychological place which encourages empathy and promotes the forging of personal connections. A connection with animals is ingrained within each of us, only it is often forgotten through a distancing of our own naturalism by the fiction of the modern world.



In Defense of Zoos

An Evolution of Purpose

Types of Zoos

Wildlife Network

Captive Breeding

02 | On Conservation

IN DEFENSE OF ZOOS

The Role of Zoological Gardens in Conservation

Zoos are often scrutinized in the public eye and deemed as cruel based merely on the concept of keeping animals in confined environments. The positive contributions they make to the efforts of wildlife conservation are in these cases over looked.

Zoos are dedicated to the protection of endangered animals both in captivity and in the wild. This is carried out through captive breeding programs, reintroduction programs, public education, and field conservation. Endangered animals are bred in captivity to help augment the populations that exist in the wild; careful attention is paid to ensuring genetic diversity and this supplement to natural reproduction rates in the wild allows reintroduction programs to help ensure the survival of many animal species. There are cases, such as that of the California Condor, which were at one point extinct in the wild but have been reintroduced with a now growing wild population thanks to captive breeding (Bove, 2015).

Public education is one of the primary functions of zoos. For many people, zoos are the only exposure they will have to wild animals and therefore the information imparted on spectators at the zoo is all they have from which to formulate an opinion of and relationship with these animals. It is vital that environmental issues are made apparent upon these initial and infrequent interactions, portraying individual human involvement as part of the solutions.

Zoos also play a fundamental role in field conservation. They provide a platform from which a variety of studies are made possible, including studies of populations in the wild, veterinary care for wildlife together with research on disease issues, and conservation awareness. All of these educational contributors help us to better understand the animals which we have had such a fascination with for centuries and as a result develop our abilities to protect them.

Although these activities do require the captivity of animals out of their natural habitats, the modern zoos of today have moved away from the historical theatrical spatial settings and place a huge focus on the accurate emulation of natural surroundings for different species – this recreation is in itself becoming an art. This allows for the intimate encounters between people and rare animals to be as realistic as possible whilst ensuring the contentment of the animal. There are very few people who would be able to pursue such experiences in the wild. Unless these experiences invoke conservation focused educational and emotional benefits, the existence of zoos cannot be justified.



Fig 26, A young girl interacts with a bearded dragon at an educational display at Johannesburg Zoo, www.joburg.org.za



Fig 27. School Group at Johannesburg Zoo
Photograph by Kevin Halama

AN EVOLUTION OF PURPOSE

Menagerie	Zoological Garden	Conservation Centre
19th Century	20th Century	21st Century
Living Natural History Cabinet Major focus: Diversity of species Exhibition: Cages	Living Museum Major focus: Habitats of animals Exhibition: Dioramas	Environmental Resouce Major focus: Ecosystems and species survival Exhibition: Holistic Immersion



Fig 28. Scimitar horned Oryx

Extinction in the Wild

According to the IUCN Red List (www.iucn.org) which is globally accepted as the most comprehensive resource for conservation status (Nuwer, 2014), there are currently some 38 known species that are extinct in the wild and now only exist in captivity, predominantly zoos. These species are dependent on human interference for survival. Programmes to increase population size and create habitat stability are facilitated through institutions such as zoos provide these creatures with a small hope for survival. One such animal is the Scimitar horned Oryx, a small population of which can be found at Johannesburg Zoo. Conservationists hope to start re-releasing these rare antelope into the wild in Chad in the near future, as soon as their population pool can support the possible loss of individuals.

It is through near extinction cases such as this that the entire concept of zoos can be justified. The traditional zoological garden for the purpose of entertainment is no longer, zoos are now required to take on the identity of a safe haven for threatened species (Nuwer, 2014).





Fig 29. California Condor

A ZOO SUCCESS

The Story of the California Condor

The California Condor, a member of the vulture family, is the largest land bird found in North America. Its story of recent survival is one that highlights the important roles played by zoos in the field of conservation.

The condor occurred naturally across many parts of north America for thousands of years but as human settlements encroached on their natural habitat reducing nesting areas and sources of food their numbers began to decrease. This habitat reduction coupled with poaching for cultural beliefs and lead poisoning from surrounding industrial activity and hunting placed the species in a position of crisis in the 20th century. By 1987 only 22 California condors remained in the wild (California Department of Fish and Wildlife). A decision was made to capture all 22 of the wild birds and start up a captive breeding programme through San Diego Zoo and Los Angeles Zoo.

Through carefully monitored breeding programmes at these two zoos conservation experts were able to maintain the wilderness lifestyle of the birds whilst providing a secure and accelerated reproduction rate through methods such as double clutching (where one egg is removed from the mother and raised by lifelike puppets to ensure the survival of both chicks). As soon as the captive reproductive pool was considered stable the programme began to release the condors back into their natural rocky shrub land and coniferous forest habitats across five concentrated release points in California and Mexico.

As of December 31, 2014 the total population of California Condors had increased to 42; with 28 of those existing naturally in the wild (California Department of Fish and Wildlife). Successful instances of breeding in the wild have been recorded and the population is now steadily growing under careful surveillance in both captivity and the wild.

As a result of the near critical endangerment and enormous conservational effort made to save this species they have become a focus of conservational education in North America as well as having fallen under legal protection. Similar to the plight of rhinos across Southern Africa, it was believed that the California Condor has mythical and symbolic significance by many native American tribes. As a result of their prominence in storytelling and cultural beliefs condors have been poached for their bones and plumage for many years.

Part of the rehabilitation of these majestic birds includes the provision of education to all groups of people about their threatened status and non-medicinal attributes – a major platform for this education is the zoos in which the incredible breeding programmes have been facilitated.

It is through the remarkable impact conservational programmes such as this have on the survival of the world's wildlife that platforms for captivity and human-animal interaction, such as zoological gardens, can be justified. Without San Diego and Los Angeles zoos, it is likely that the California Condor would be extinct.



Fig 30. California Condor



Fig 31. Young Lions, Johannesburg Zoo
Authors Own



Fig 32. Petting Zoo, United Kingdom
www.wormsandgermsblog.com



Fig 33. Fuji Safari Park, Japan
www.wikipedia.org

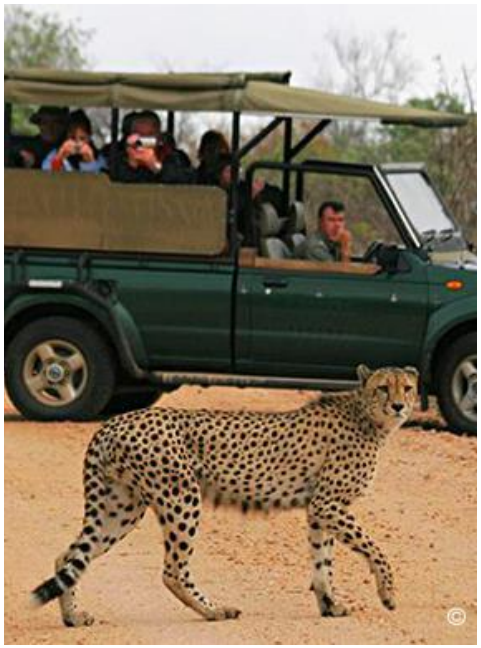


Fig 34. Kruger National Park
www.wild-wings-safaris.com

TYPES OF ZOOS

Urban Zoo

These zoos are the remnants of menageries and animal collections from hundreds of years ago. They are commonly located in the middle of cities and are bound by a prescribed area. Animals in these zoos are often kept in small scale enclosures with limited opportunity for expansion owing to their urban context. In many cases the zoo grounds were initially part of larger public parks and they are valued green spaces within the city.

Local Example: Johannesburg Zoo

Petting Zoo

This tactile typology is a home for domesticated animals that are gentle enough to interact physically with children. Farm animals such as goats, sheep and rabbits are common examples of animals suited to this function. Petting zoos rarely exist in isolation and are commonly found as part of larger facilities such as urban zoos, playgrounds and theme parks.

Local Example: Farmyard section, Montecasino Bird Gardens

Safari Park

Safari parks fill the middle ground between urban zoos and game reserves. They are large open areas that can be accessed by visitors via private vehicles. The typology provides animals with more space whilst still falling within a viable day-visit proximity to the city. Within the parks larger areas are often enclosed to keep animals separate because the parks are not big enough to support a naturally functioning biodiversity balance and still require management.

Local example: Rhino and Lion Park

Game Reserve

Game Reserves are the largest of the animal captivity typologies and are the closest representation of what is considered truly wild. Expansive sections of natural landscape are enclosed and protected allowing animals to live and reproduce at natural rates within them. Humans are granted limited and controlled access for viewing. Even these expansive areas still limit migratory patterns and the territorial behaviour of certain animals.

Local Example: Kruger National Park

WILDLIFE NETWORK

For conservational efforts to be successful it becomes important to view single facilities in a greater network of wildlife welfare. A zoo cannot operate in isolation but rather needs to be recognised as a component of a conservational network working towards a common cause. This allows for the appropriate designation of space for respective animals, whilst relieving some of the spatial constraints of wildlife management in an urban environment.

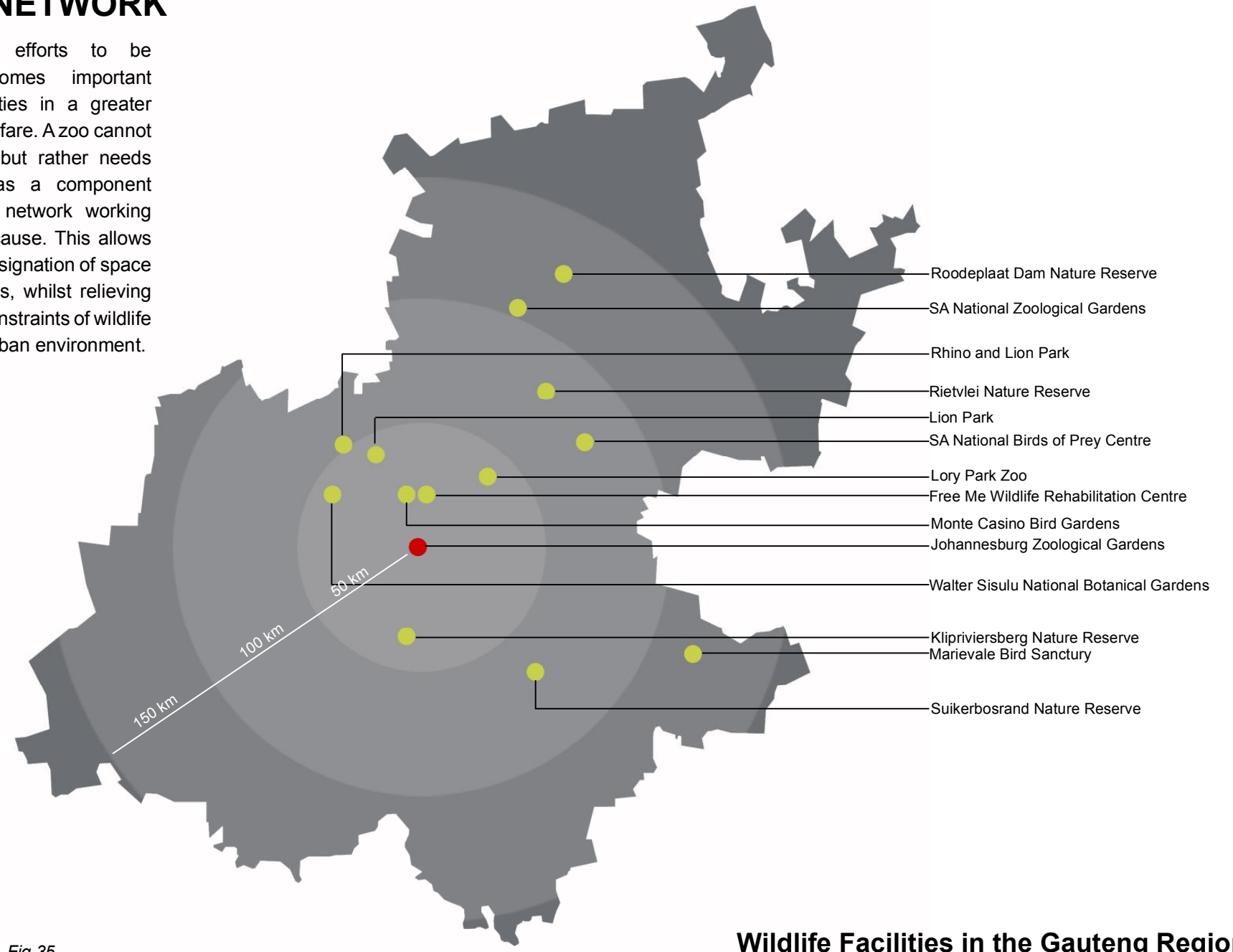


Fig 35. **Wildlife Facilities in the Gauteng Region**

CAPTIVE BREEDING



Fig 36. Amphibian breeding programmes, Johannesburg Zoo

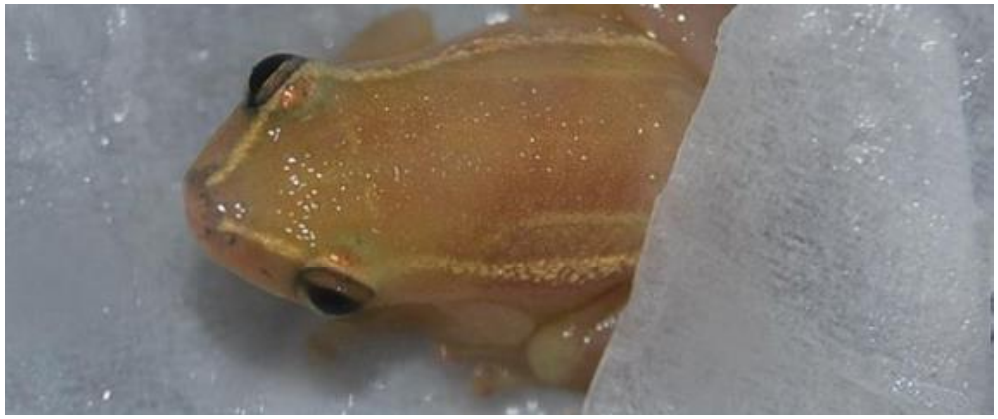


Fig 37. Amphibian breeding programmes, Johannesburg Zoo

Summary

The term captive breeding refers to the process by which animals reproduce away from their natural habitat in conditions managed/overseen by people. The environment and choice of mating partner are to a large extent controlled by people. Captive breeding is generally facilitated with the aim of one of three main purposes, the first being commercial purposes, the second for research and public facilities such as zoos and the third is to increase the captive and wild populations of endangered species.

In all three instances captive breeding programmes present both pros and cons. In many instances captive breeding has been brought into question under themes of animal welfare and interference with natural processes however the value of such practices within conservational efforts is immeasurable.

Captive Breeding as a Conservational Tool

According to the WWF Policy Statement of 2007, captive breeding of rare, threatened and endangered species is considered as the final step of any conservation strategy. The rehabilitation of natural habitat together with the protection of existing wild colonies of animals is prioritised as far as possible before the human involvement of captive breeding. It is only in extreme cases where species face extinction that captive breeding programmes are condoned.

The World Wildlife Fund explains that the reason captive breeding is considered a last resort is because of the risk and uncertainty involved. Removing wild animals from their natural habitats places them under a great deal of stress and there is no guarantee that the captive animals will breed in unfamiliar environments. It is for this reason imperative to never see captive breeding as a substitute for conservational efforts made on-site in natural environments but rather as a parallel effort in augmenting the entire natural ecosystem.

With the dwindling numbers of so many species, captive breeding is however becoming a necessity in the viability of conservation strategies. The IUCN recommends that any species with a wild population of less than 1000 individuals should be introduced into captive propagation (IUCN 1987), more recent research has suggested that this threshold be increased to 2500 individuals (Foose, 2005).



Fig 38. Ground Hornbill chick, Johannesburg Zoo



Fig 39. Ground Hornbill, Johannesburg Zoo

The Role of Zoos in Captive Breeding

Zoos provide a vital platform for the facilitation of captive breeding programmes around the world. Captive breeding specialist, Thomas Foose, explains, “zoos must serve as reservoirs of both genetic and demographic material that can periodically be transfused into natural habitats to re-establish populations that have been extirpated or to revitalize populations that have been debilitated by genetic, demographic, or environmental problems”(Foose, 2004, p37). The immense risks involved with dealing with the last remaining individuals of any species calls for the design and use of appropriate programmes that form part of detailed scientific conservation management plans. As a result zoos become the environment for the critical point of species survival (wwf.panda.org).

The Johannesburg zoo currently facilitates captive breeding programmes for a number of amphibians, vultures, wattled cranes, ground hornbills, indigenous sheep, chimpanzees and Bactrian camels, together with participation in the rehabilitation of injured rhinos.

Environments Conducive to Breeding

One of the major risks, as outlined by the WWF, is the unwillingness of captive animals to breed when they find themselves in a foreign environment. The process of transportation and the unfamiliarity of a new home places animals under psychological stress which often leaves them in a position in which they are unable to reproduce. The creation of an environment in which the animal feels comfortable is imperative to the success of such projects. If the aim of captive breeding projects is the re-introduction of animals to wild environments, minimal variance between natural and captive environments becomes a central focus (Foose,2004). This uniformity refers not only to terrain and climate but also social components such as the presence of other animals and natural feeding schedules. Many traditional zoo environments would not fulfill these requirements for larger animals which are increasingly falling under their conservational responsibility.



Site Selection

Site Context

Understanding Surroundings

History of Johannesburg Zoo

Heritage Buildings on Site

03 | Site Selection

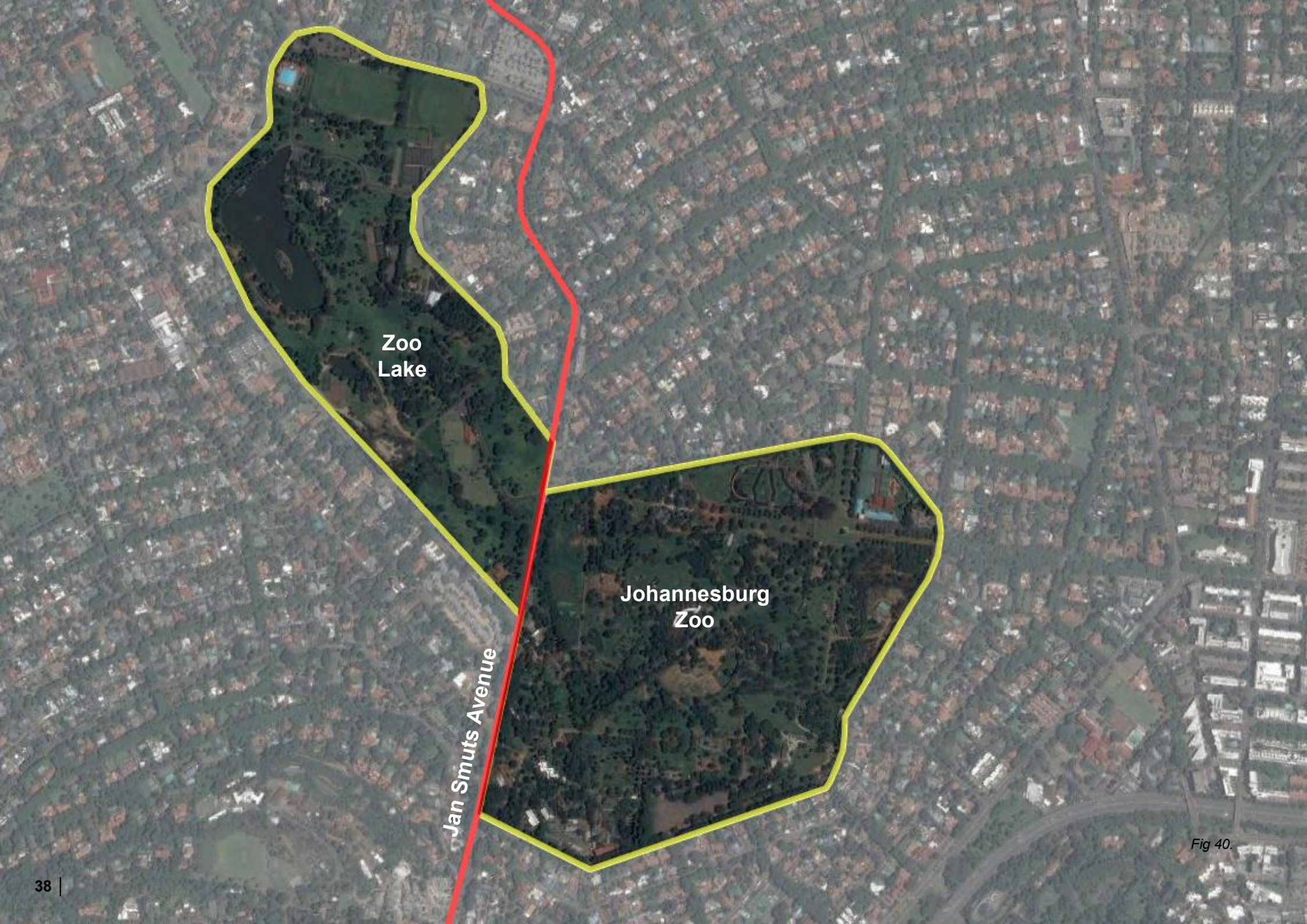


Fig 40.

SITE SELECTION
Johannesburg Zoo

My chosen site, Johannesburg Zoo, is located in amongst some of Johannesburg's oldest suburbs. The greater site is comprised of two sections, namely the Zoo and Zoo Lake precincts, which are separated by one of the city's main roads, Jan Smuts Avenue. Together they make up one of the most interesting and dynamic public spaces within the urban fabric of Johannesburg.

This green lung, surrounded by the established tree-lined suburbs of Saxonwold, Forest Town and Westcliff, attracts patrons from far and wide for a diverse range of activities on a daily basis. The land has played an important role in Johannesburg's history with its link to the mining era and as one of the few places that remained non-discriminatory during the Apartheid era – it was, and still is an undeniably strong contributor to the social environment of the city.

The Johannesburg Zoo, as a recreational and educational facility in the urban context has an important responsibility of ecological exposure to its city-dwelling visitors. For many, the animals seen at Johannesburg Zoo will be their only interaction with wildlife. The position of the zoo, along a major urban circulation route and adjacent to a well utilised public park highlights the facility as a fundamental opportunity for the promotion of conservation and encouragement of wildlife education within the urban setting.

SITE CONTEXT

Natural vs Man Made Johannesurg

This map shows some of the natural attributes of the Johannesburg landscape making up the greater surrounding site context. The landform contours, highlighted by the prevalent ridge line together with the major rivers and wetland areas characterise the area in a way that is not often recognised when looking at the built form. The under layer showing the road networks exposes the overbearing new geometries that have been layered over the natural landscape. The site (highlighted in red) is an area in which the underlying natural physical form is exposed within the urban context. The site intervention as a result responds to both the natural context and surrounding built environment.

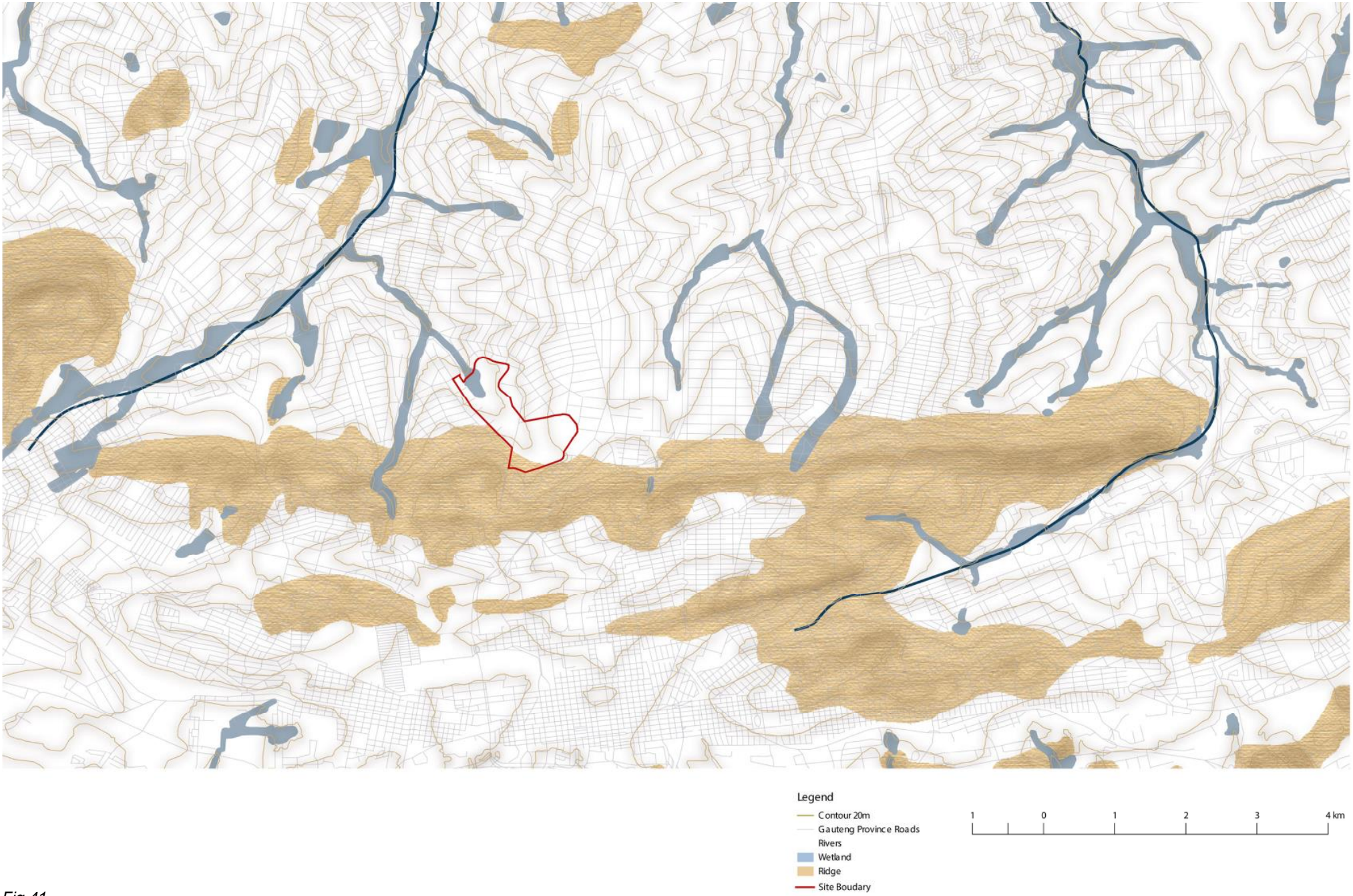

Legend
Contour 20m
Gauteng Province Roads
Rivers
Wetland
Ridge
Site Boudary
1
0
1
2
3
4 km

Fig 41.

SITE CONTEXT

Johannesburg Green Space Network

Within the built fabric of greater Johannesburg there are networks of green spaces which have been preserved and protected from human development. Both public and private, these green open spaces act as lungs for the city, taking on social, recreational, educational and conservational roles. The green spaces are closely linked with the natural physical formation of the terrain (ie. Green spaces are more likely around existing water sources and inaccessibly rugged land forms).

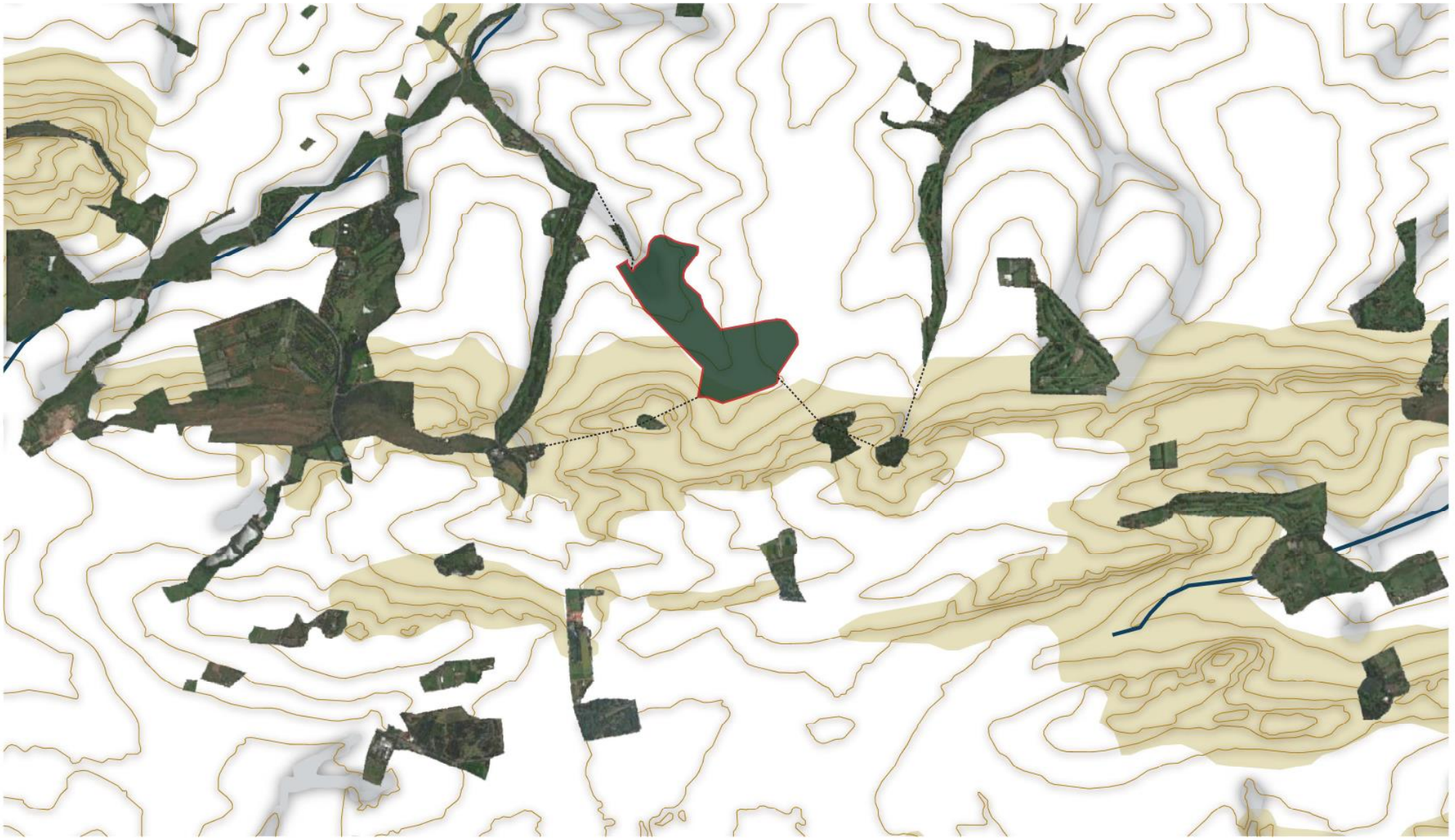
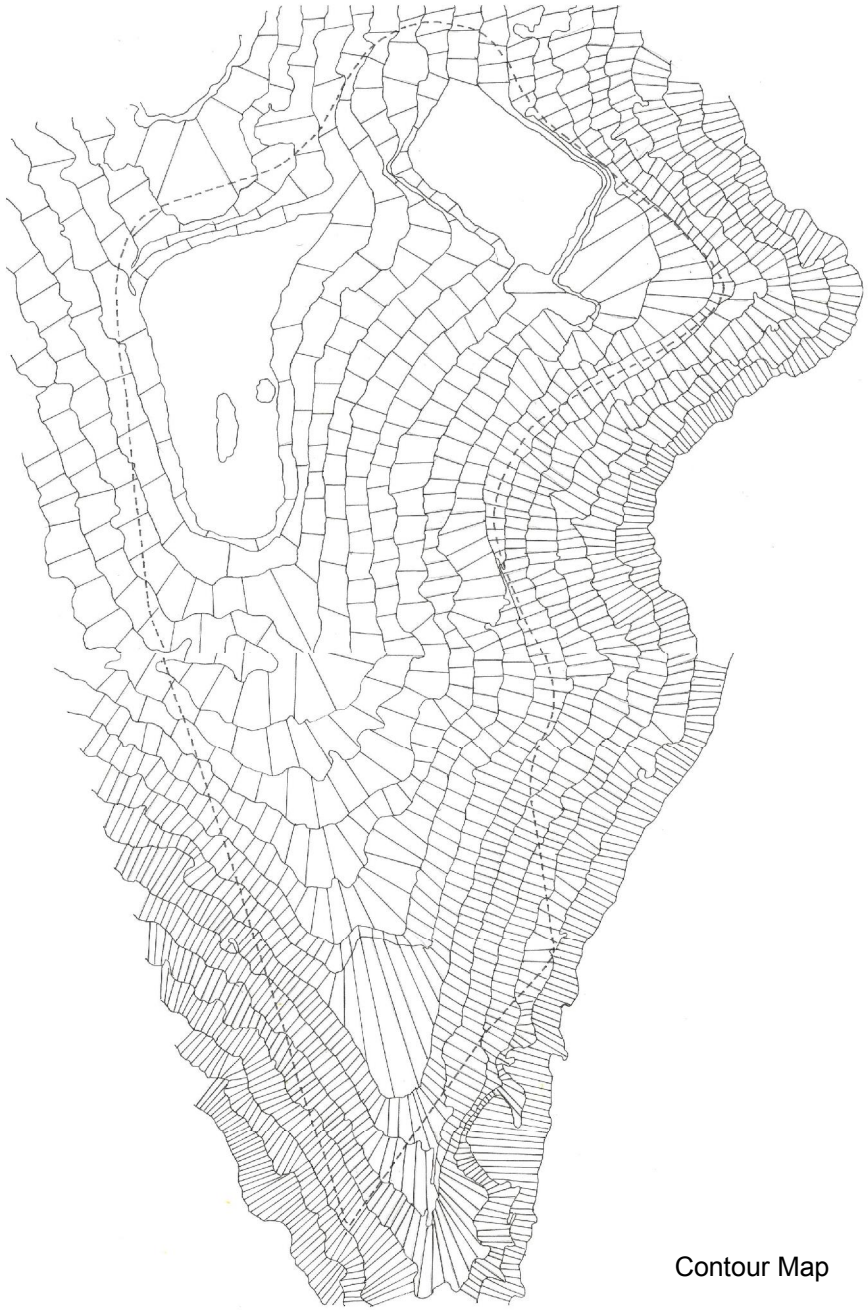

Legend
Contour 20m
Aerial photograph of green space
Rivers
Wetland
Ridge
Site Boundary
Figurative Green Space links
1
0
1
2
3
4 km

Fig 42.

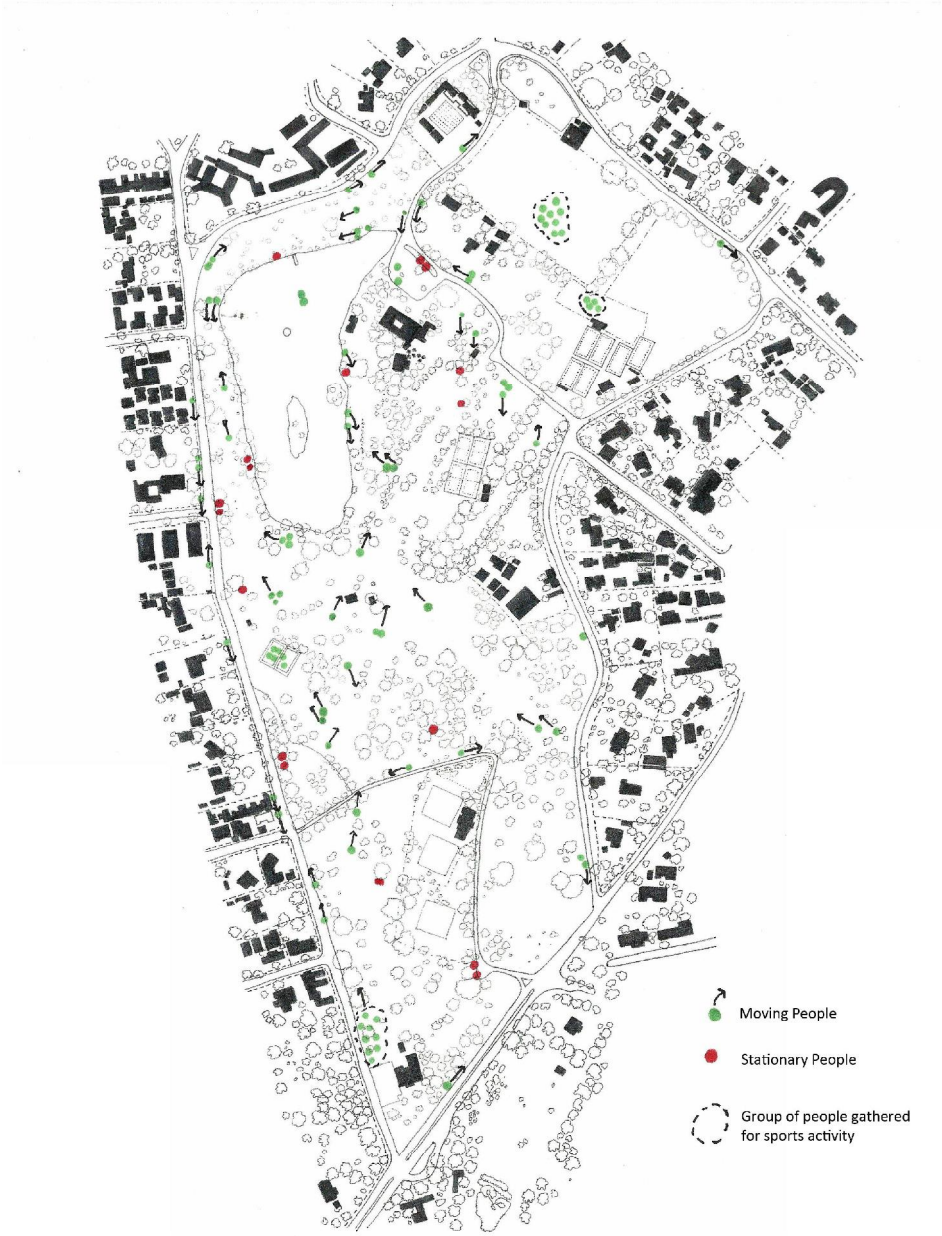
UNDERSTANDING SURROUNDINGS
Zoo Lake Analysis

In order to fully understand the context of the Johannesburg Zoo it becomes important to analyse the adjacent Zoo Lake precinct with the intention of allowing the two facilities to hinge off one another's presence and success.

This series of mapping analyses the natural formation and uses of the pubic area. Activity mapping provides insight into the dynamic user group of Zoo Lake as a public facility and allows conclusions to be drawn about the usage zones and the effect they could have on the neighbouring zoo.



Contour Map

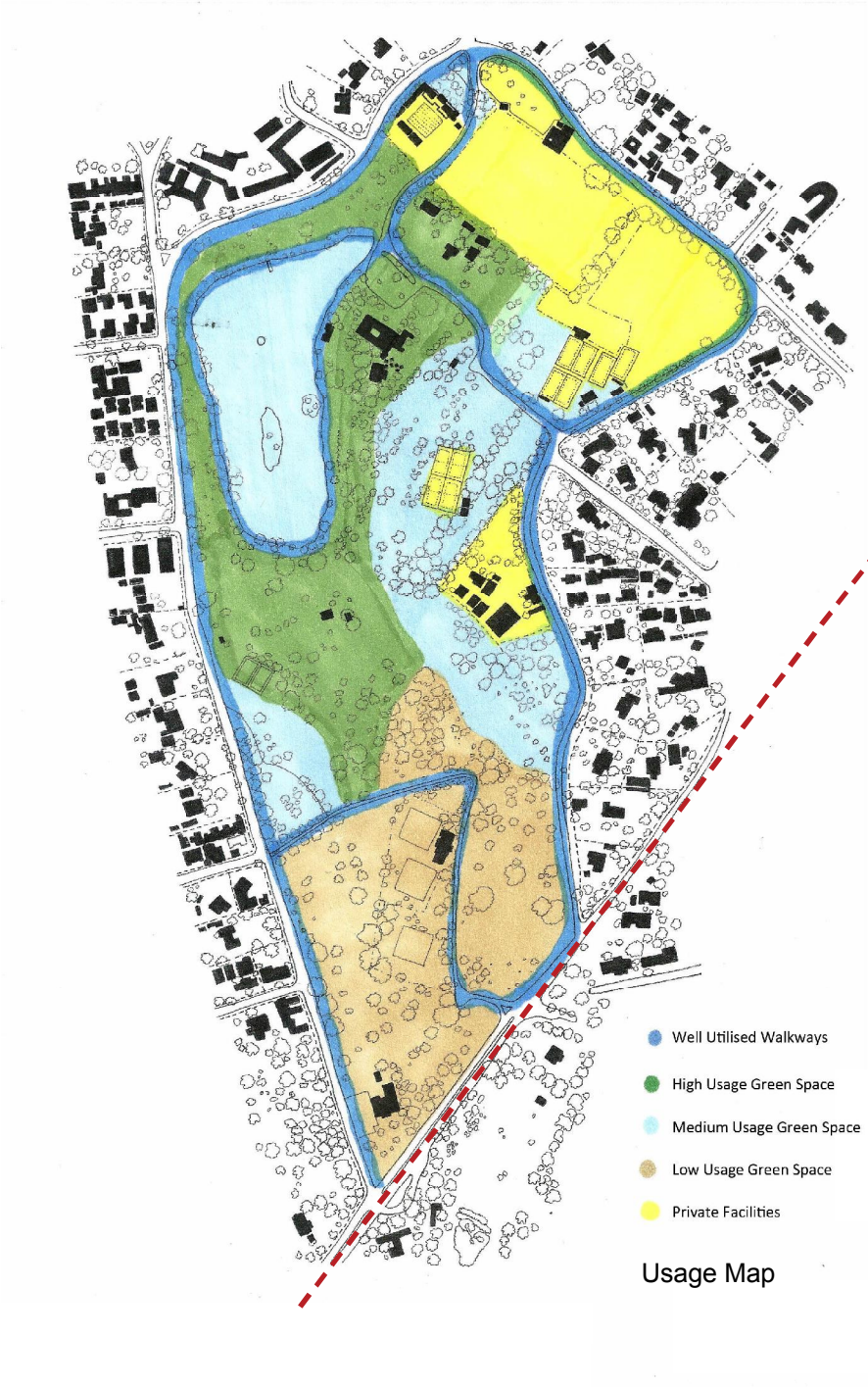


Population Map



Activity Map

- Moyos Restaurant – accessible to paying customers
- Boating on Zoo Lake- popular weekend activity, especially for small groups of friends and children
- Swimming – Zoo Lake sports club facility
- Bus/Taxi Stop – well utilised bus shelter frequently used as a pick up point for buses and taxis during the week and on weekends
- Games – small groups of men are observed to play card games on the lake periphery during the week
- Social meeting – small groups of people, male and female, sit on the periphery of the lake to talk
- Basket Ball – public basketball courts are well utilised in the evenings and on weekends
- Reading – solitary people have been observed reading under trees in the open park during the day
- Sleeping – individuals have been observed sleeping in the less utilised areas of the park under trees
- Sports Fields – Zoo Lake sports club, used for cricket, rugby, soccer and other field sports
- Tennis Courts – Zoo Lake Sports club tennis
- Public benches – scattered throughout the park area are well utilised during the week and on weekends
- Dog Walkers – tend to walk the periphery of the park
- Runners – tend to run the periphery of the park to maximise distance
- Walkers - individuals and groups walk throughout the park, not particularly on allocated pathways but tend to avoid the heavily treed areas



Usage Map



Fig 43. Photograph of Zoo boundary on Jan Smuts Avenue (author's own)
This image shows the lack of visual accessibility and interaction between the zoo and zoo lake

This conclusive map of the usage zones within the Zoo Lake precinct identifies the edge bordering on the zoo grounds as underutilized and as a result an opportunity for intervention. The adjacent edges of Zoo Lake and the zoo, facing onto the busy Jan Smuts avenue, become a key focal area in the design intervention because of their potential as edges of exposure. Creating an interaction between these two edges could augment the effective usage of both facilities. Exposure of the zoo, and it's conservational intent, through this boundary is treated as an opportunity for creating interest in the facility as a whole – a kind of visual advertisement, enticing visitors to the zoo.



Fig 44, Laying out of Rand Regiments Memorial Site overlooking Saschenwald Plantations
Museum Africa Archives

HISTORY OF JOHANNESBURG ZOO

In 1904, 200 acres of land was donated to the Town Council of Johannesburg for the purpose of recreation. The land was donated by Mr Hermann Eckstein, an influential business man involved with the development of Johannesburg as a mining town. The area was to be named after its sponsor to be called Hermann Eckstein Park which today is made up of Johannesburg Zoo and Zoo Lake. Prior to its donation the land formed part of the Saschenwald (left), an area in which Eckstein had planted three million trees for use in the expanding Johannesburg mines (Shorten, 1970). The area is now known as the suburb of Saxonwold which is still characterised by its established tree-lined roads.

A small sample of wild animals was already living on the grounds when it was handed over to the town council and these became the catalyst for the formation of the Johannesburg Zoological Gardens (Shorten, 1970).

The first official enclosure was a lion enclosure built by the town council. In the years that followed the zoo expanded rapidly in both animal population and built form. Wild animals were donated to the zoo from numerous private sources which saw the construction of a number of small scale animal enclosures.

In 1910 the bandstand was built to encourage recreational concerts and live music. The tram network from the Johannesburg town was also extended to the zoo which caused a huge increase in zoo visitors (Shorten, 1970). All of the development during this time was very closely paralleled by colonial trends in park and zoological design in Europe at the time (Peel, 1903). Between 1913 and 1915, enclosures were built for a number of the larger animals including the elephants, hippos and rhino. These stone buildings are still intact but have been re-purposed with different functions today. In line with zoo trends at the time, the zoo purchased animals such as Asian elephants and camels for the purpose of animal rides, these were a huge drawcard to the visitor experience.

The first moated camps were introduced at Johannesburg Zoo in 1921, this was the first attempt at moving away from the small cages. This new lion enclosure was the first of its kind in the Southern Hemisphere (Daily Mail, 2.2.1939). Racial segregation was common practice in South Africa at this time and separate facilities for racial groups were built at the zoo in 1929 along with segregated playground developments.



Fig 45, Saschenwald Plantation
Johannesburg Heritage Association Archives



Fig 46, Lion Cage, 1920's
Johannesburg Heritage Association Archives



Fig 47, Rand Regiments Memorial
Museum Africa Archives



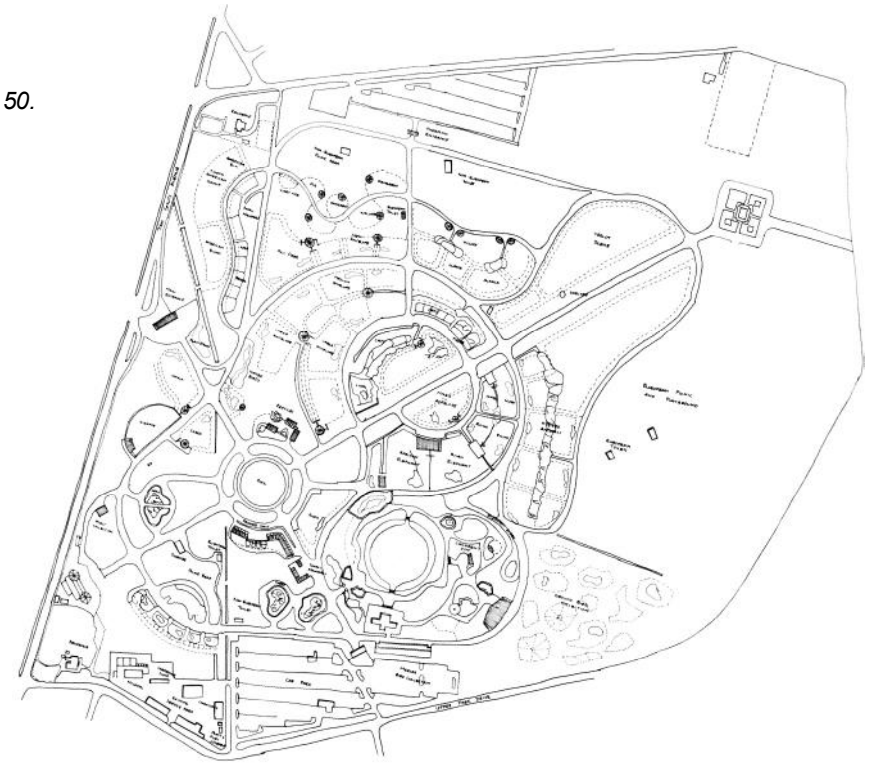
Fig 48, Memorial Boulevard, 1940's
Johannesburg Heritage Association Archives

ZOO DEVELOPMENT OVER TIME

Fig 49.



Fig 50.



1938 - 1947

In 1936 an animal hospital was built. This facility has since been upgraded in the 1960's and again in the 1990's and it forms an integral part of the zoo system. It is noted that all of the zoo enclosures built before 1960 at Johannesburg Zoo were designed by the Town Engineer's Departments and not by zoo or animal specialists (Geddes, 2002). This is clearly visible today upon analysis of the inappropriate functions of some of the original zoo buildings. Up until 1961 visitors were allowed access to the zoo for free after which people over the age of 16 years were charged a small fee.

1960's

During the late 1960's an international conscience began to develop around animal welfare, in which the colonial zoo model was questioned (Peel, 1970). During this time Johannesburg Zoo responded with a large scale redevelopment which favoured larger enclosures with moats as barriers. Zoo specialist and international consultants were involved in the drafting of the new master plan but labour shortages meant that the plan was never realised in entirety.

Fig 51.

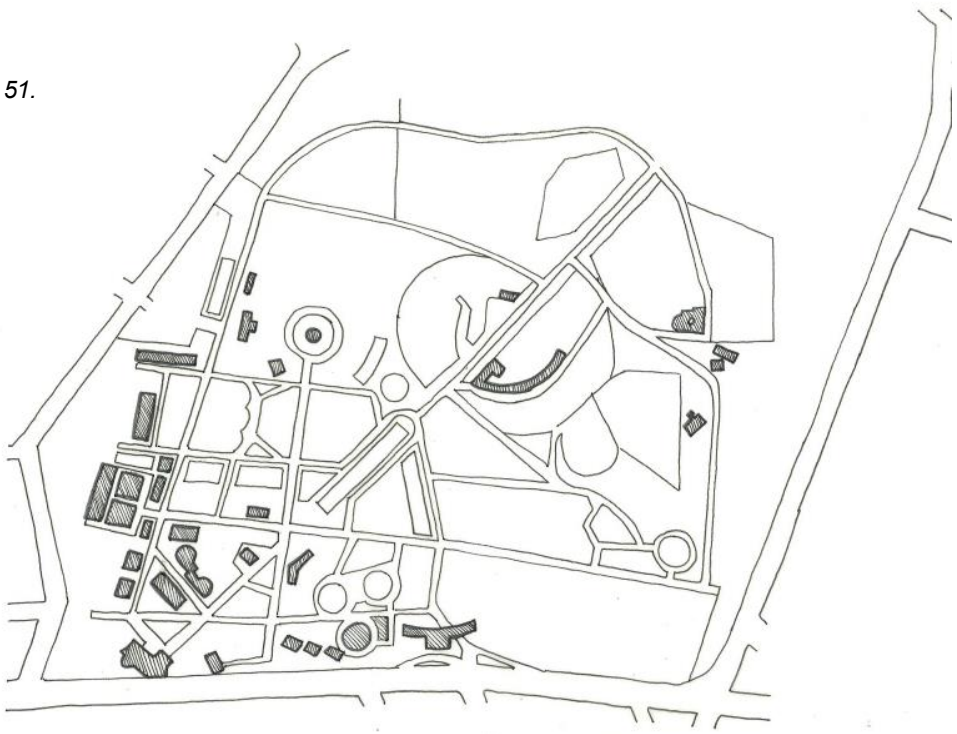


Fig 52.



1981

By the 1980's the zoo had firmly begun to focus its purpose on education. Between 1982 and 1985 the animal adoption scheme was introduced along with nocturnal tours and the Polar Bear trust. For the first time tours around the zoo were offered and volunteers were encouraged to come and learn about the zoo animals. All new developments were executed with consultation of field experts and the zoo began to establish itself as a conservation friendly environment (Geddes, 2002).

Present Day

During the 1990s the zoo felt the burden of financial pressures and the need arose for business management to be included in its priorities. Sponsorship for certain enclosures was encouraged on a number of scales, most notably the Anglo Gold Lion enclosure which was completed in 2000. This period also saw the dedication of staff to purely educational roles with programmes such as zoo holiday clubs and school tours becoming ever more prevalent. Development during this time has slowed due to financial and spatial restrictions.

HISTORICAL IMAGERY

The following series of historical photographs provides a sense of the atmosphere at Johannesburg Zoo during its early years. The wide established tree lined pathways were flanked by small cages and human-like architecture with the classical park layout still very prevalent.

The zoo was concentrated towards the south west corner where most of the original built form was placed and dissipated into the park space towards the Rand Regiments Memorial in the opposite corner.



Fig 53.



Fig 54.

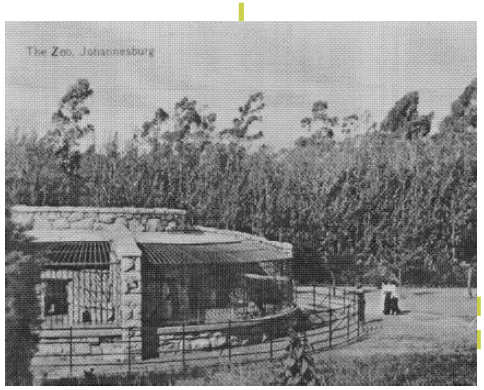


Fig 55.



Fig 56.



Fig 57.

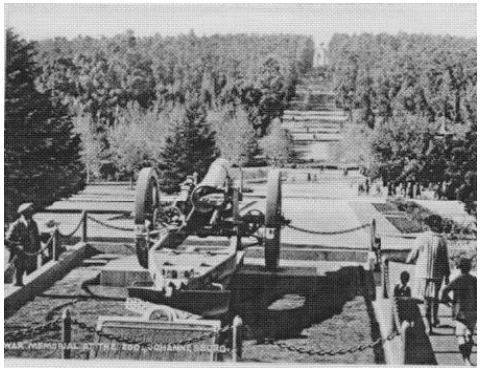


Fig 58.

Fig 53, Aviary enclosure and pathways

Fig 54, Elephant House and pool

Fig 55, Lion Enclosure

Fig 56, Elephant Rides

Fig 57, Pond looking at westcliff ridge

Fig 58, Cannon down major walkway to memorial

All images accessed from Museum Africa archives, dated pre 1940.

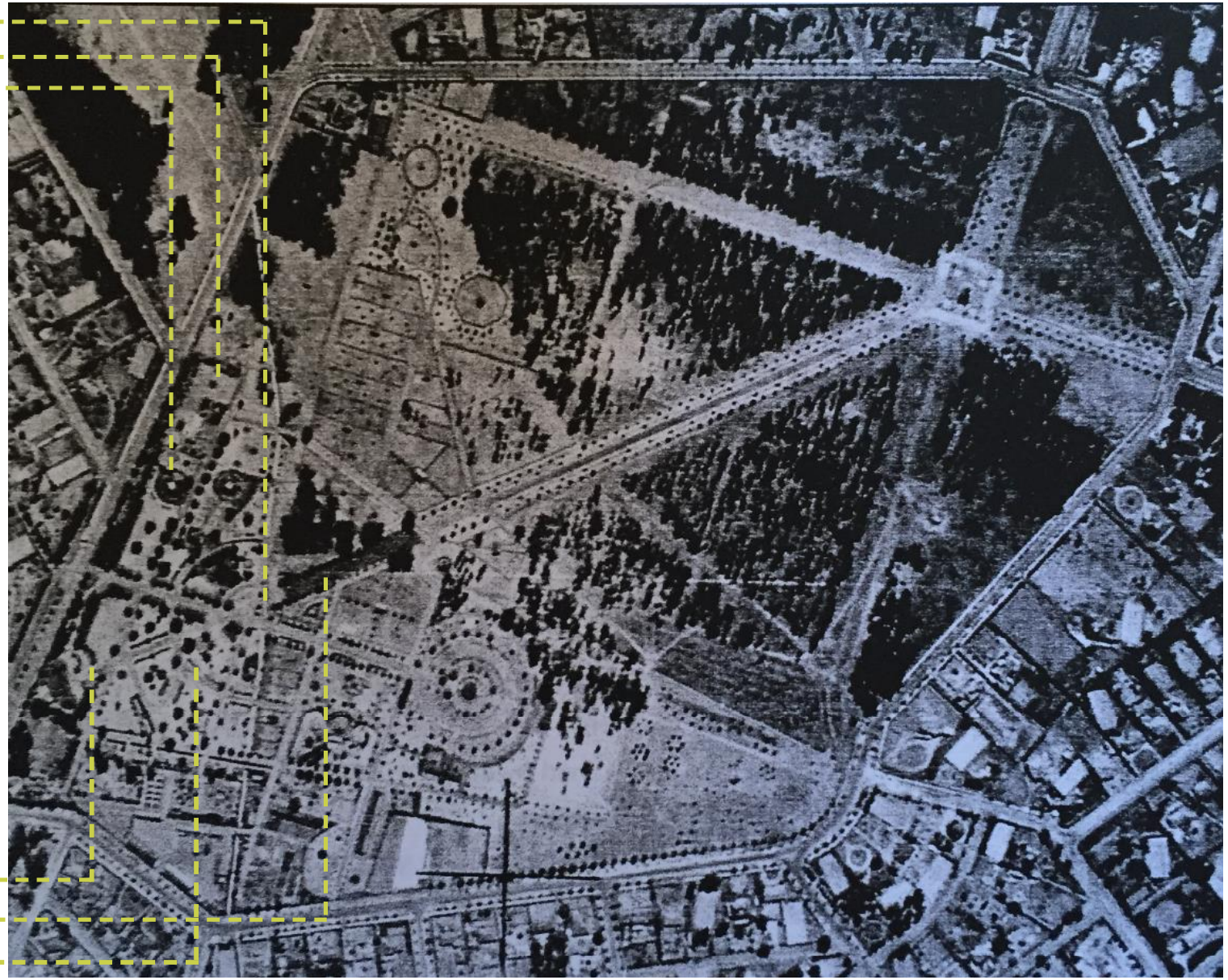


Fig 59. Historic aerial photograph dating from between 1938 and 1947 clearly showing the five vistas radiating out from the Rand Regigments Memorial in the top right corner.

Image accessed from Museum Africa archives.

Rand Regiments Memorial

The Rand Regiments Memorial was designed by Sir Edwin Lutyens in 1911, just a few years after the Johannesburg Zoo was established. The memorial is to commemorate the soldiers who died in the Anglo Boer war between 1899 and 1902. The foundation stone was laid by the duke of Connaught in 1910 at which time the design was not yet finalised (Chipkin, 1993).

Clive Chipkin describes the structure as “Lutyens’ Arc de Triomphe” (Chipkin, 1993) making a connection with the similarly structured arch in Paris. The memorial has a definite neoclassical style, perhaps influenced by the work of Sir Herbert Baker and Cecil Rhodes who were avidly designing neoclassical architecture in South Africa at the time.

The sculpture mounted atop the memorial structure is ‘the angel of peace’ by Naoum Aronnson which is visible from multiple directions within the zoo grounds, and from a substantial distance. In 1947 a museum of military history was opened adjacent to the memorial and in recent years the museum and memorial grounds have been fenced off from access through the zoo

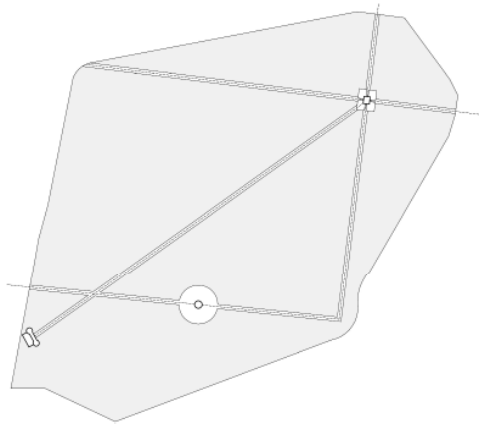


Diagram indicating memorial as focal point for zoo layout

The memorial serves as the focal point for the historical axis upon which the zoo grounds are laid out. The original layout with five vistas radiating out from the memorial was proposed by Sir Herbert Baker (Shorten, 1970), and although not all of the original pathways still exist these axis remain ingrained into the zoo experience though the tree-lines that flank/ed them (right).



Fig 60, Construction of the memorial
Museum Africa Archives



Fig 61, Looking back towards the zoo
Author’s own



Fig 62, Tree lined historical axis leading to memorial
Author’s own



Historical Buildings

The buildings indicated in grey on the adjacent map are structures that have survived through the various redevelopment phases of the Johannesburg Zoo. All of the highlighted buildings were constructed a minimum of 60 years ago and fall under heritage protection.

Heritage classification information accessed from the Johannesburg Heritage Council.

1. Entrance building and offices
2. Old Elephant House
3. Old Lion enclosure
4. Old Polar bear house
5. Small mammal enclosure
6. Gardener's Cottage
7. Tea House
8. Curator's Dwelling
9. Restaurant
10. Goat hills
11. Animal Hospital
12. Information Centre
13. Bandstand and surrounds
14. Aviary
15. Single compartment animal sleeping facility
16. Elephant houses
17. Double compartment animal sleeping facility
18. Giraffe houses
19. Rand Regiments Memorial

Historical Buildings

Photographs (author's own) of heritage protected buildings at the Johannesburg Zoo with descriptions of their original and current functions.



Original: Jan Smuts Entrance
Current: Entrance and admin offices



Original: Lion Enclosure
Current: Historial display



Original: Polar Bear enclosure
Current: Red panda enclosure



Original: Gardeners Cottage
Current: Private zoo admin facility



Original: Small mammal enclosures
Current: Small mammal enclosures



Original: Tea House
Current: Education Centre



Original: Bandstand, entertainment
Current: Bandstand, entertainment



Original: Second Elephant House
Current: Elephant House

Buildings for People, not Animals

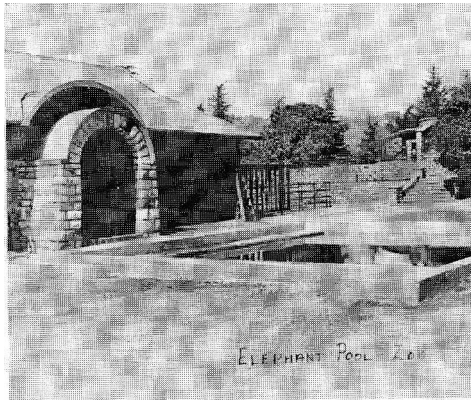


Fig 63. Old Elephant House with pool
Museum Africa Archives

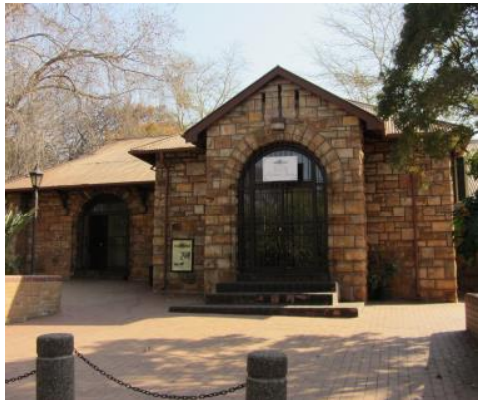


Fig 64. Old Elephant House (author's own)
now a conference venue

Inspection of many of the historical animal houses at Johannesburg Zoo, and in fact across many zoological gardens from the same era, brings to light the close similarities between residential buildings designed for people and these artificial animal habitats. Little to no understanding of the needs of animals, except for basic shelter, is evident in structures such as the old elephant house at Johannesburg Zoo. Residential typologies geared for human occupation have been simplified internally and deemed acceptable for animal use. Part of the contemporary design intent of this thesis is the re-purposing of these historical structures for human use, for which they are far more suited.

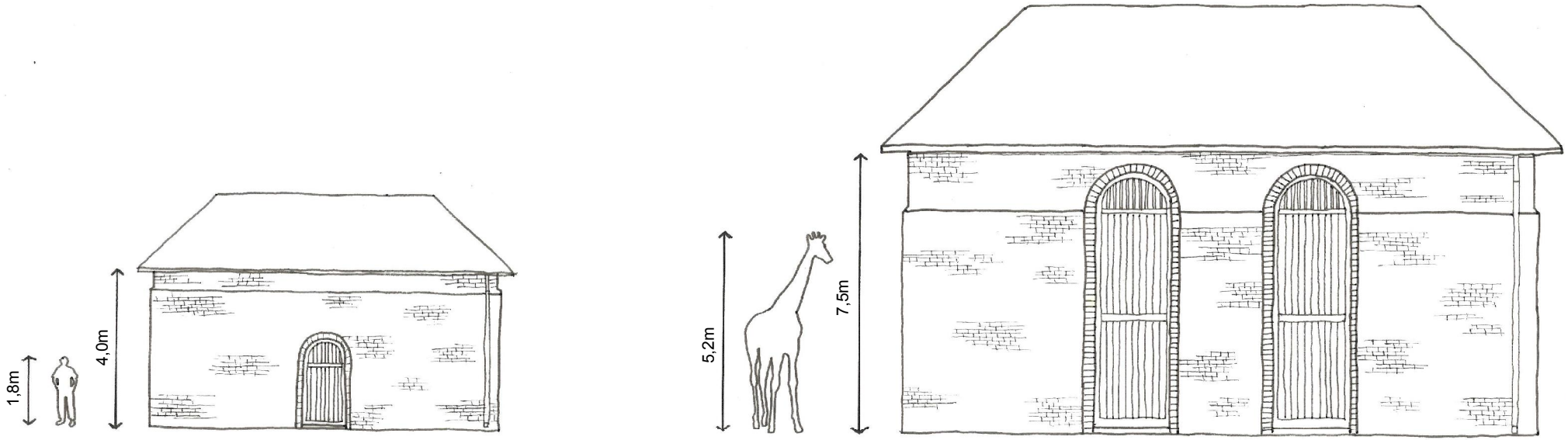


Fig 65. Sketch showing an example of the giraffe house at Johannesburg Zoo, illustrating how a number of historical pieces of zoo architecture are simply 'people buildings' that have been upscaled to accommodate animals

HERITAGE BUILDINGS ON INTERVENTION SITE

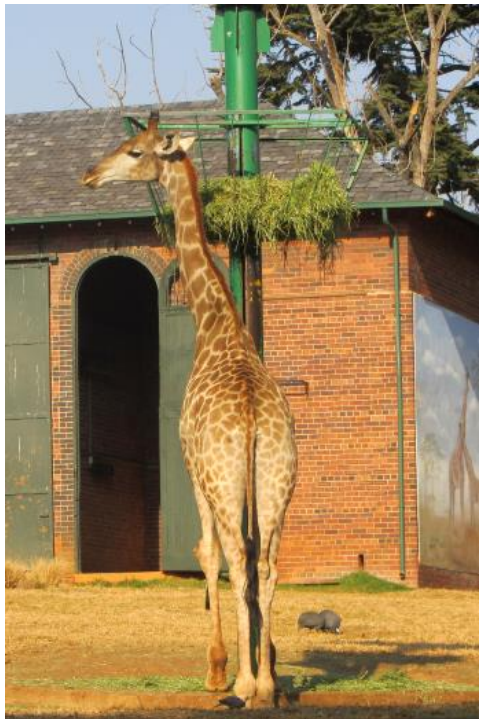


Fig 66. Giraffe House, authors own



Fig 67. Double Giraffe House, authors own

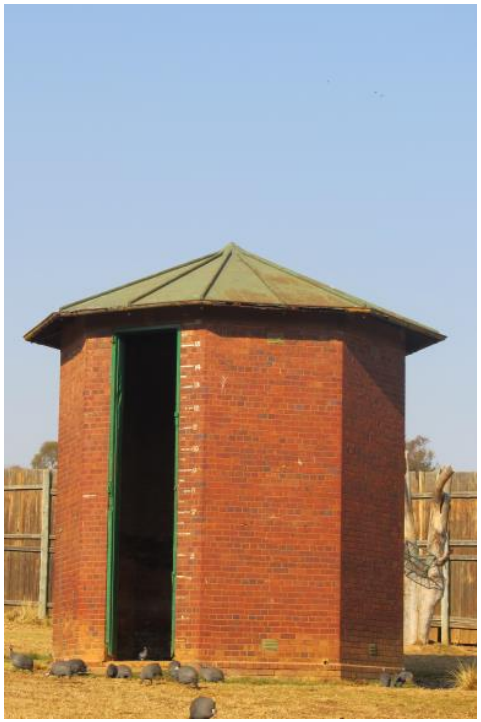


Fig 68. Single Giraffe House, authors own

Giraffe Houses

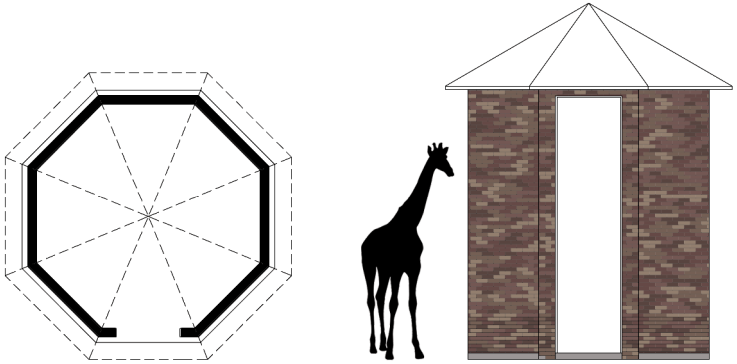
The first giraffe house (single) was built in 1933/4 and designed to be a sleeping facility for the single giraffe that the zoo had at that time. The second giraffe house (double) was added to the same enclosure in 1942 when the zoo's giraffe population was increased to three. The buildings appear as standard human scale shelters from that time which has been stretched to two-and a half volumes to accommodate the height of the giraffes. The buildings are constructed with face bricks with a gabled slate roof and are characterised by their tall hinged timber doors on the northern side.

According to an assessment done by the Johannesburg Heritage council in 2004 the structures are considered significant to the heritage of Johannesburg Zoo as they are older than 60 years. The structures themselves are protected but available for re-use with a different function and are deemed to be structurally sound. The giraffe houses also signify an important development in zoo thinking – previously the animals were kept in small cages on constant display to visitors. These 'houses' allowed the animals a little bit of privacy for the first time. Sleeping areas were the only hiding spaces available at the animal's discretion.

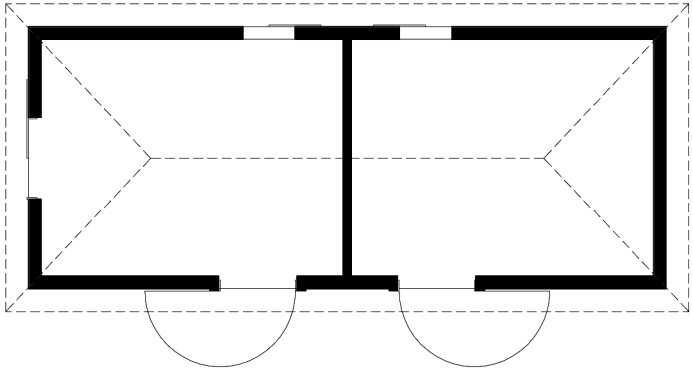
Part of the Unzoo concept is the dedication of built form for human use and the pledge of open natural spaces for animals. These giraffe houses fall within the selected site area for the development of an unzoo section within Johannesburg Zoo. The scheme proposes to re-purpose and re-use these characteristic structures as a part of the new zoo infrastructure programmed for human use in favour of their animal shelter history.



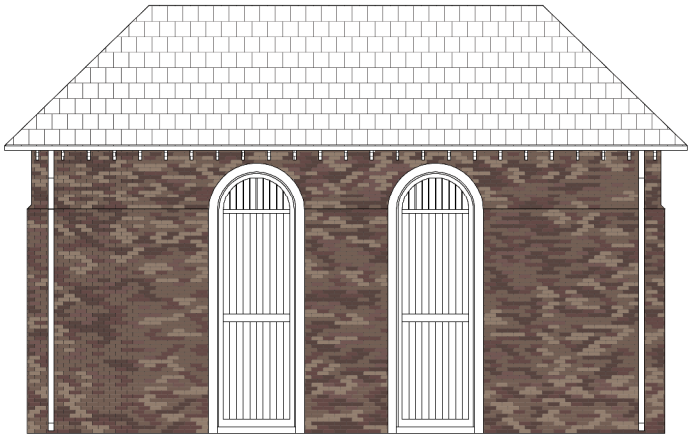
Locality Plan, selected intervention site and giraffe houses



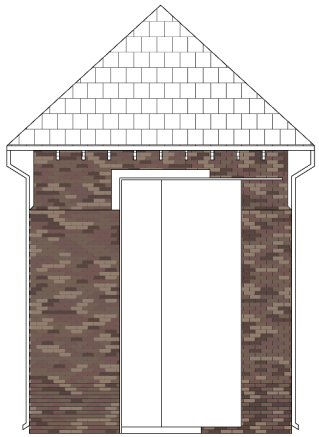
Single Giraffe House Plan and Elevation



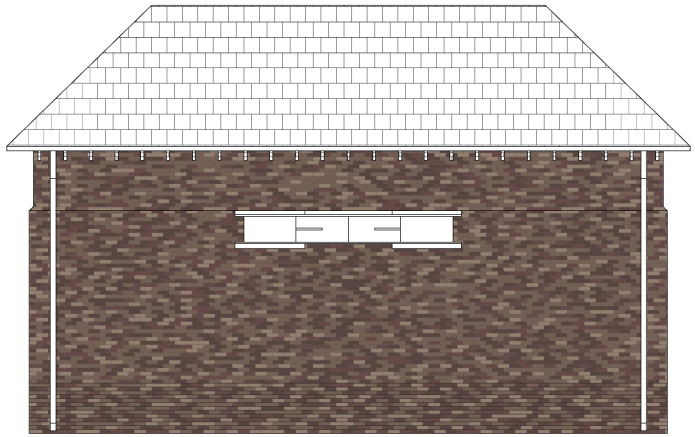
Double Giraffe House Plan



Front Elevation, Double Giraffe House



East Elevation



Back (south) Elevation



Natural Features

Entrances and Boundaries

Site Mapping

Zoo Logic

Species Analysis

Placement of Intervention

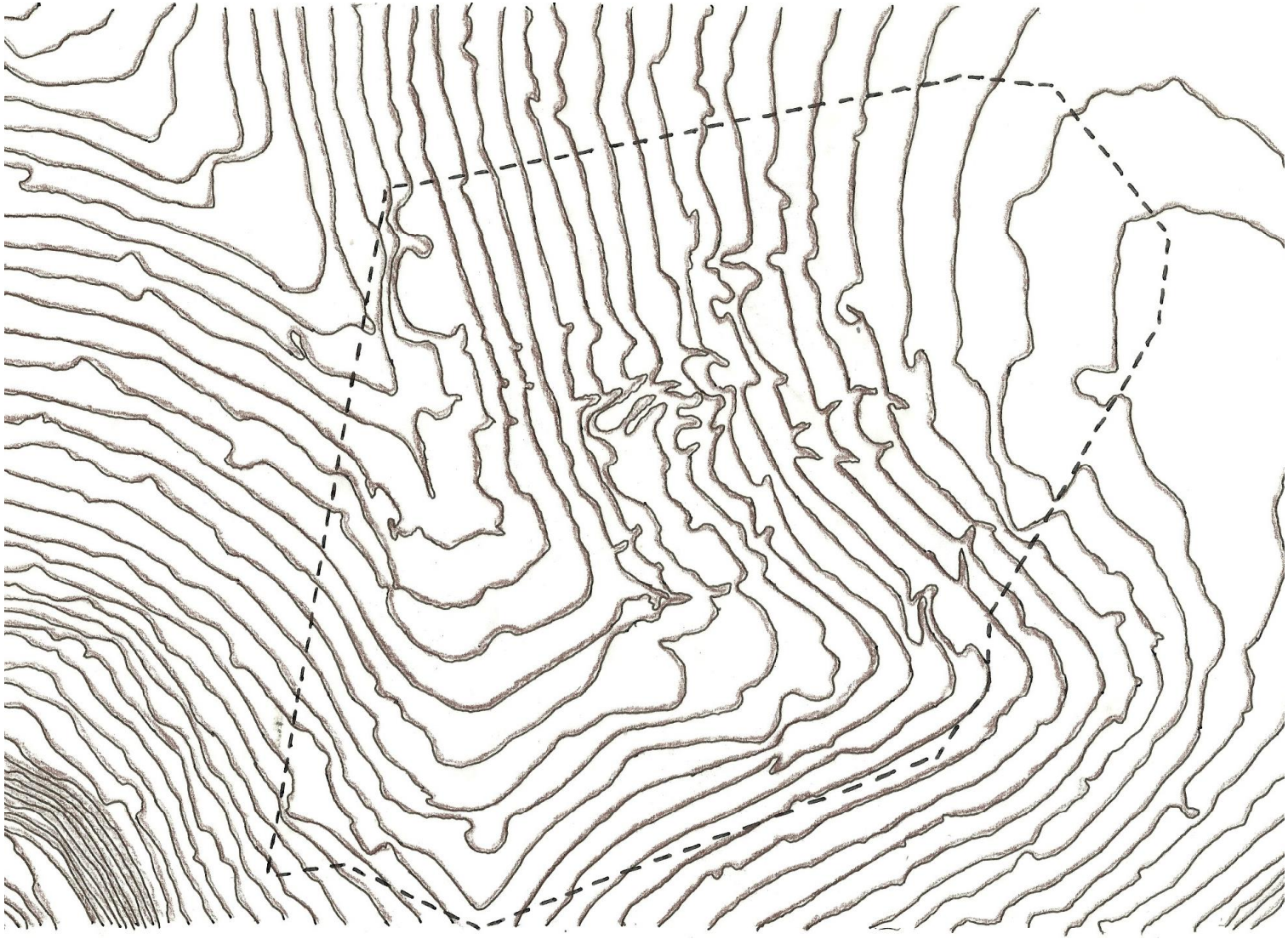
04 | Johannesburg zoo Analysis

NATURAL FEATURES
Terrain and Trees

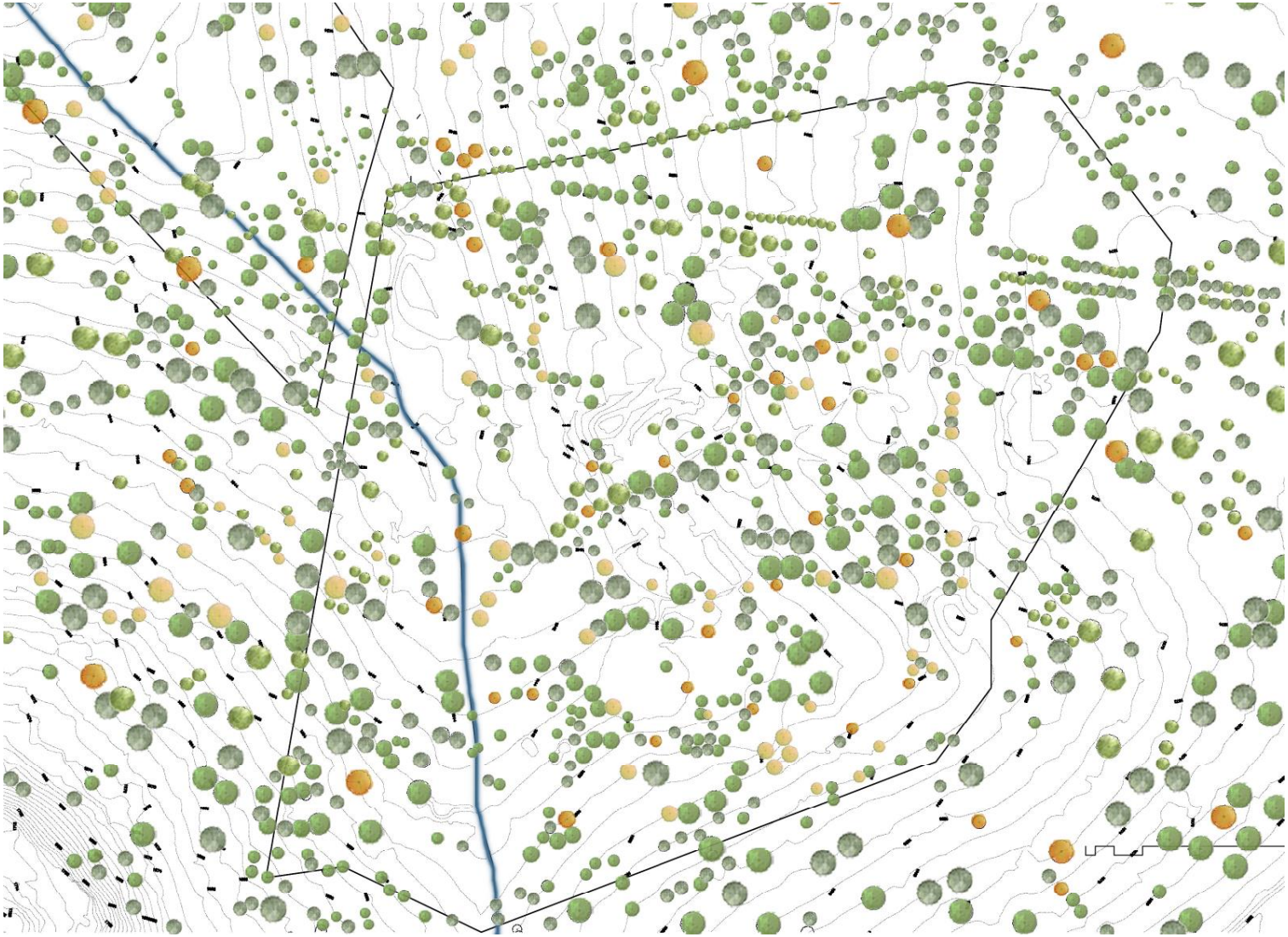
With the design intent of freeing up portions of the ground plain from built form to reallocate space to its natural function, understanding the natural terrain becomes important for design decisions. The adjacent mapping illustrates the landform, tree canopy and river line that make up the Johannesburg Zoo grounds.

From the contour patterns one can see that the zoo is nestled into the base of the prominent ridge line with a gradual slope towards the north-west corner across the entire site. Consideration of the pedestrian heavy nature of a zoo visit makes taking this gradient into account very important – particularly with regard to the layout of pathways and continuity of circulation routes.

The tree canopy exists as a layer of significant historical relevance within the zoo. Referring back to the history of the site as a plantation followed by the formal park layout, the trees tell a story of geometries past that have changed and developed at ground level. Consideration of these elevated axes



Mapping of Landform



Mapping of Trees and River Line

provides an opportunity for the respectful preservation of the zoo's history through contemporary development.

The river line that runs through the western side of the zoo grounds is also taken into consideration to ensure the continuity of the natural elements of the surrounding areas.

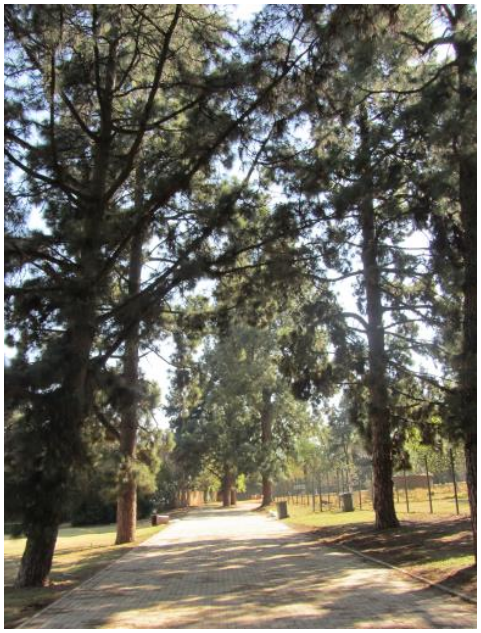


Fig 69. Tree lined pathways at the Johannesburg Zoo (author's own)



Existing Jan Smuts Avenue entrance to be maintained and utilised as the closest entrance to the re-development scheme

ENTRANCES AND BOUNDRAIES

Each new developmental phase of the Johannesburg Zoo has brought with it an alteration/addition/change of entrance facilities. This is a direct result of the growing population of zoo visitors as well as the ease of access to the grounds within the busy urban fabric.

Entrance to the zoo is an important experiential aspect to a zoo visit. It is the point of origin when planning a circulation route and becomes a landmark element for navigation around the grounds. The entrance facility sets the tone for the experience of the zoo as a whole and if used effectively can become an educational filter through which the rest of the zoo is viewed.

For this reason, the major built form of this thesis intervention is sited in close proximity to one of the most effective existing entrances so that it becomes the first port of call for many zoo visitors.



Existing Jan Smuts Avenue entrance, drop off area for busses and public transport



Existing Jan Smuts Avenue entrance, drop off area for busses and public transport

All photographs of entrance facilities are author's own



Original zoo entrance on Jan Smuts Avenue boundary - only the gate posts remain as a protected heritage structure.



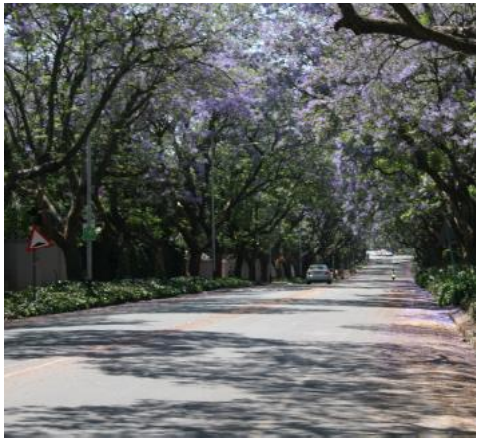
Upper Park Drive entrance - currently under construction to expand parking facilities.



Rand Regiments Memorial Entrance - access to the military museum and zoo.



Service entrance on Erswold Way - to remain and be utilised in new re-development proposal.



Characteristic tree lined streets that surround the zoo - the distinct walled separation of suburb and zoo functions effectively as two different typologies



Upper Park Drive entrance - currently under construction to expand parking facilities.

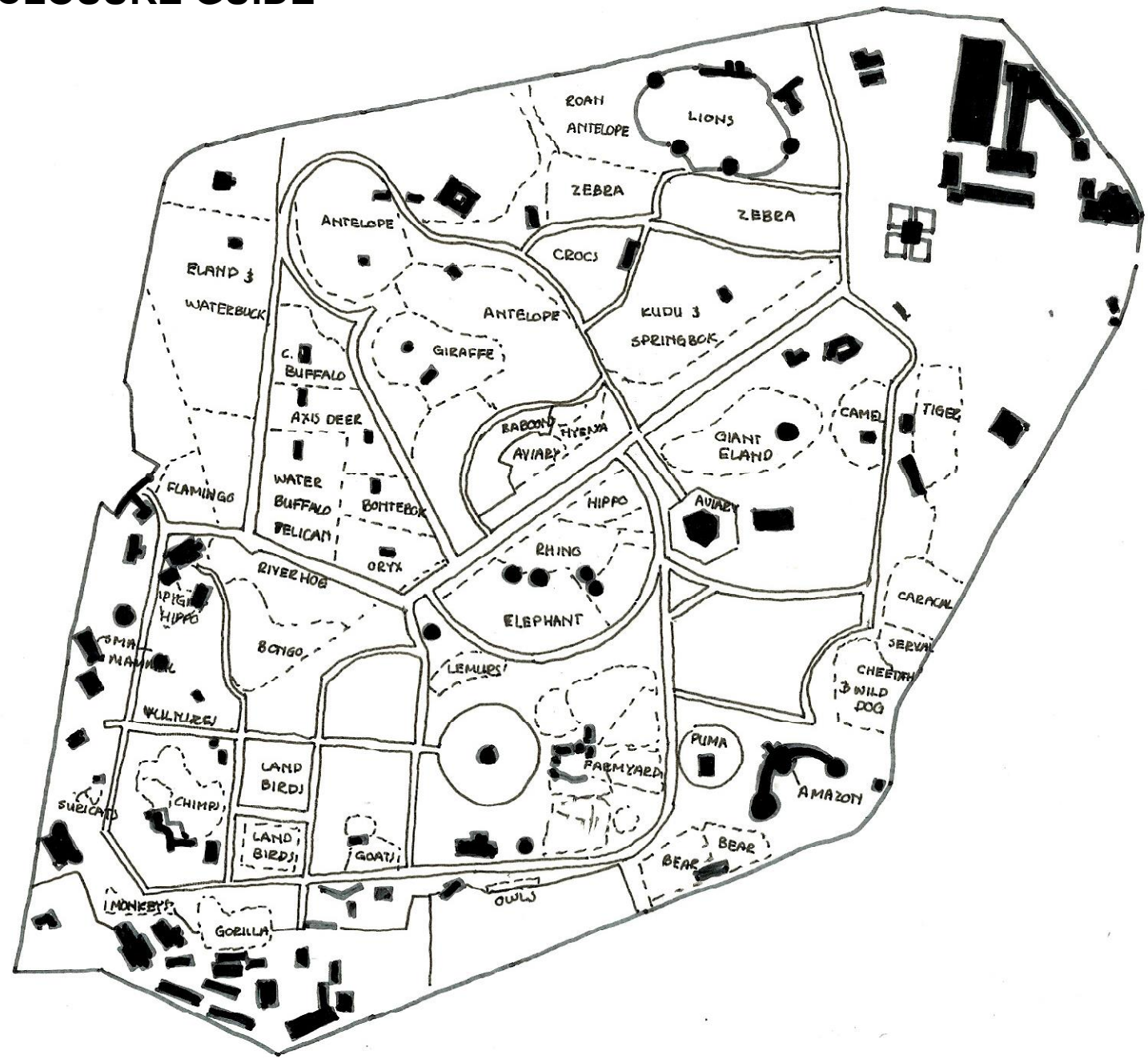


Rand Regiments Memorial Entrance - zoo access threshold.



Service entrance on Upper Park Drive

ANIMAL ENCLOSURE GUIDE



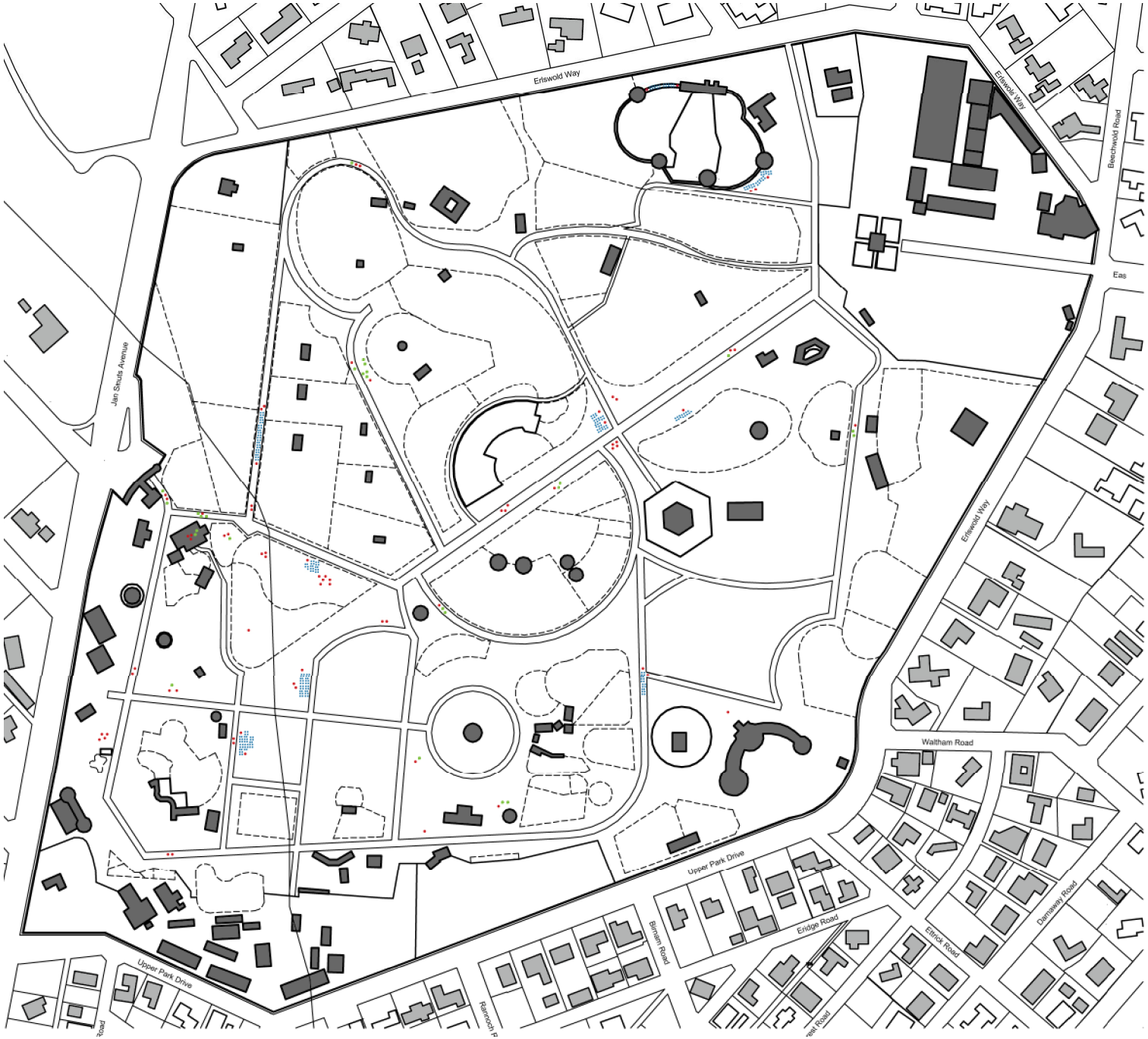
SITE MAPPING

Visitors and animals at Johannesburg Zoo

The following mapping series illustrates the population of visitors within the zoo grounds. People are indicated where they have stopped moving to observe an exhibit or rest in order to gain a better understanding of the usage areas and movement patterns and visitor demographic within the zoo.

Key:

- Adults
- Children
- School Groups



Weekday Mapping



Key:

- Adults
- Children
- School Groups

Weekend Mapping



Two out of three adults visiting the Zoo are accompanying a child

**World association of zoos 2014*

People spend on average 90 seconds at a zoo exhibit

**World association of zoos 2014*



SITE MAPPING CONCLUSIONS

From this mapping the following set of conclusions about the existing zoo can be drawn.

- The predominant visitor demographic during the week is school groups accompanied by adult chaperons.
- The weekend demographic is characterised by smaller groups of adults and children averaging between group sizes of 2 – 6 people.
- The Lion enclosure is the most popular attraction.
- The zoo layout functions effectively with evenly distributed points of interest drawing people to all parts of the zoo.
- The cheetah/wild dog enclosure on the eastern boundary is not as accessible as the other enclosures, perhaps as a result of walking distance and pathway gradient.
- The central boulevard is actively used as a base point and pit-stop/rest area perhaps as a result of separating the zoo into two halves.
- People do not necessarily stick to the pathways but rather try and obtain the best position for observation.

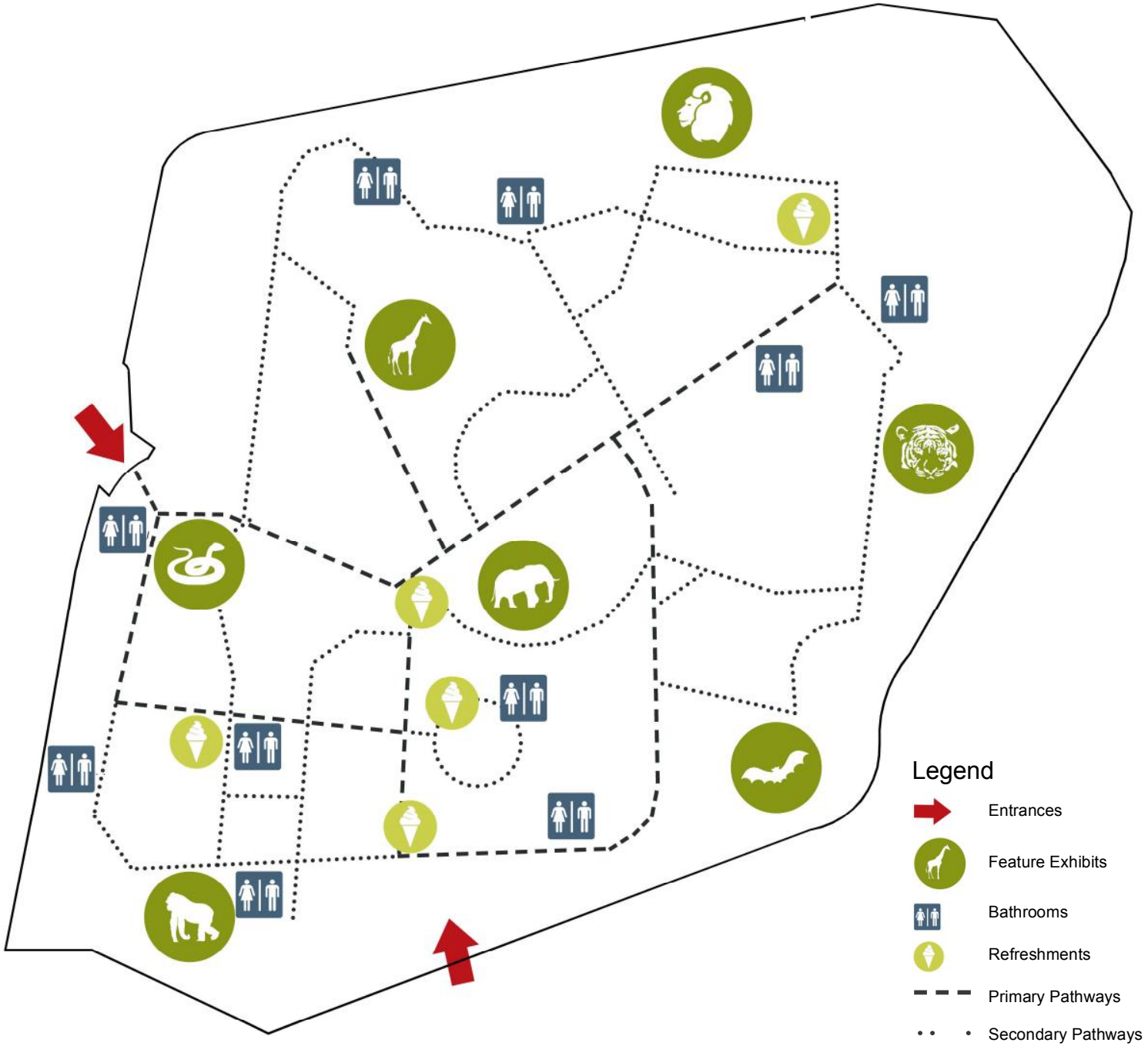
ZOO LOGIC

Owing to the meandering experiential nature of zoos it becomes imperative to apply a certain logic to their layout in order to create an effective visitor experience. Relationships between different features together with the designated pathways set up the framework for zoo patrons to navigate their way through the grounds.

Johannesburg Zoo, in its current form, works effectively in ensuring that there is a constant interest throughout all parts of the zoo. There are sufficient amenities scattered throughout the grounds and all of the pathways link up to create a logical network for viewing each of the animals.

As with any collection, there are bound to be some features that are more appealing to visitors than others, they can be considered highlights of the zoo. Johannesburg zoo have effectively dispersed these feature exhibitions over the entire site to draw people to each section of the zoo and in so doing the slightly less exciting exhibits get exposure en-route. This ensures a wholesome viewing experience for zoo visitors.

It becomes very important through this analysis to ensure that any intervention within the zoo does not break up this effective logic but rather ties in with the flow of movement and accessibility of amenities as well as maintaining the magnetic disbursement of highlight features.



SPECIES ANALYSIS

As part of my site analysis it became necessary to analyse the existing animal population that lives at Johannesburg Zoo. I conducted the following analysis in order to better understand the diversity of species and requirements of each animal to ensure the suitability of my proposed design intervention. The data also served as a tool in determining the compatibility of animal species in the proposed new mixed enclosures.

		Species	Conservation Status	Habitat Biome and requirements	Social Structure
		Primates			
1	Indigenous	Suricate	Least Concern (LC)	Dry desert terrain - burrows into the sand	Mob'or 'clan'of between 20 and 50 individuals
2		Samango monkey	Least Concern (LC)	Indigenous forests - lives in the tree tops	Territorial - harem structure, dominant male with females
3		Chacma Baboon	Least Concern (LC)	woodland, savanna, steppes and sub-desert	Troops of multiple adult males, females and offspring
4	Exotic	L'hoest Monkey	Vulnerable (VU)		
5		Da Brazza's monkey	Least Concern (LC)		
6		Red tailed guenon	Least Concern (LC)		
7		Mona monkey	Least Concern (LC)		
8		Diana monkey	Vulnerable (VU)		
9		Mongoose lemur	Critically endangered (CR)		
10		Siamang	Endangered (EN)		
11		Ringtailed Coati	Least Concern (LC)		
12		Black Spider monkey	Endangered (EN)		
13		Mandrill Baboon	Vulnerable (VU)		
14		Yellow Baboon	Least Concern (LC)		
15		Hamadryas Baboon	Least Concern (LC)		
16		Black and white ruffed lemur	Critically endangered (CR)		
17		Red bellied lemur	Vulnerable (VU)		
18		Ringtailed lemur	Endangered (EN)		
19		Lar gibbon	Endangered (EN)		
20		Sumatran Orangutan	Critically endangered (CR)		
21		Western Lowland gorilla	Critically endangered (CR)		
		Reptiles			
22	Indigenous	Rock monitor	Least Concern (LC)	dry habitats including steppes, prairies and savannahs	isolation
23		Nile crocodile	Least Concern (LC)	aquatic environments - lakes, rivers and marshlands	very social with hierachy determined by size
24		Puff Adder	Least Concern (LC)	savanna and grasslands - mostly nocturnal	isolation
25		Rhioceros Viper	Least Concern (LC)	forests	isolation
26		Rhinkals	Least Concern (LC)	grassland habitats	isolation
27		Ball Python	Least Concern (LC)	grassland and savannas - non venomous	isolation
28		Boomslang	Least Concern (LC)	trees	isolation
29		Black neck spitting cobra	Least Concern (LC)	savanna and semi-deserts	isolation
30	Exotic	Red eared terapin	Least Concern (LC)		
31		Bearded Dragon	Least Concern (LC)		
32		African Spurred tortoise	Least Concern (LC)		
		Amphibians			
33		Pickersgills Reed Frog	Critically endangered (CR)		
34		Amazon exhibition species	Least Concern (LC)		
		Birds			
35	Indigenous	Wattled Crane	Vulnerable (VU)	wetlands - shallow marsh like habitats	flocks of 10 or mor birds
36		Kori Bustard	Near threatened (NT)	deserts and savanna regions	solitary
37		Peafowl	Least Concern (LC)		
38		Southern Ground Hornbill	Vulnerable (VU)	savanna habitat with large trees	cooperative breeding pairs
39		Saddlebill stork	Least Concern (LC)		
40		African wood owl	Least Concern (LC)	forest and woodland areas	solitary
41		Spotted Eagle owl	Least Concern (LC)	versatile	solitary or pairs
42		Verrauxs eagle owl	Least Concern (LC)	semi-desert and dry savanna	breeding pairs
43		African marsh owl	Least Concern (LC)	open marshy areas	solitary
44		Barn owl	Least Concern (LC)		
45		Cape eagle owl	Least Concern (LC)	moutainous regions and hilly outcrops	breeding pairs
46		Southern white faced scops owl	Least Concern (LC)	savanna and dry woodland areas	alone or in pairs
47		Grass owl	Least Concern (LC)	grasslands	solitary
48		Grey heron	Least Concern (LC)	versatile, near water	solitary or pairs
49		Blue crane	Vulnerable (VU)	dry, grassy uplands	large flocks
50		Marabou stork	Least Concern (LC)	wet and arid habitats, often near human settlements	small coloies
51		Cape robin chat	Least Concern (LC)	forest edges, scrub and fynbos	pairs
52		Cape turtle dove	Least Concern (LC)	open habitats	small groups, solitary
53		Natal francolin	Least Concern (LC)	temperate regions	pairs
54		Green crested turaco	Least Concern (LC)	forests	solitray or pairs

55		Longtailed starling	Least Concern (LC)	natural forest and forest edges	solitray or pairs
56		Cape glossy starling	Least Concern (LC)	woodlands and bushveld	small flocks
57		Black chested snake eagle	Least Concern (LC)	diverse habitats with open terrain to hunt and trees to perch	solitary
58		African harrier hawk	Least Concern (LC)	natural woodland and treed areas	solitary
59		Steppe buzzard	Least Concern (LC)	woodland and open savanna	small flocks
60		Southern bald ibis	Vulnerable (VU)	open grassland and semi-desert	small colonies
61		Cape teal	Least Concern (LC)	water bodies	small groups
62		Verraux Eagle	Least Concern (LC)	hilly mountainous regions that are dry and rockey	solitary or breeding pairs
63		Pied Crow	Least Concern (LC)	open country	pairs or small groups
64		Cape Vulture	Vulnerable (VU)	temperate areas - nests on cliffs and tall tree tops	solitary
65		Flamingo	Least Concern (LC)	shallow waters	large colonies
66		African blackduck	Least Concern (LC)	water in and around wooded hills	small groups or pairs
67	Exotic	Grey headed parrot	Near threatened (NT)		
68		Puna silver teal	Least Concern (LC)		
69		Guira cuckoo	Least Concern (LC)		
70		Bar headed goose	Least Concern (LC)		
71		Tambourine dove	Least Concern (LC)		
72		Orange cheecked waxbill	Least Concern (LC)		
73		Silvery cheeked hornbill	Least Concern (LC)		
74		Yellowbilled duck	Least Concern (LC)		
75		Whooper swan	Least Concern (LC)		
76		Goffins Cuckatoo	Least Concern (LC)		
77		Galah	Least Concern (LC)		
78		Andean Condor	Near threatened (NT)		
79		Green winged macaw	Least Concern (LC)		
80		Demoiselle crane	Least Concern (LC)		
81		White Pellican	Least Concern (LC)		
82		Sulphur crested cockatoo	Least Concern (LC)		
83		Senegal parrot	Least Concern (LC)		
84		Blue fronted amazon	Least Concern (LC)		
85		Ruppels parrot	Least Concern (LC)		
86		Hahns macaw	Least Concern (LC)		
87		Laughing Kookaburra	Least Concern (LC)		
88		King Vulture	Least Concern (LC)		
89		Fulvous whistling duck	Least Concern (LC)		
90		Mute swan	Least Concern (LC)		
91		Blue and gold macaw	Least Concern (LC)		
92		Yellowbilled kite	Least Concern (LC)		
		Small Mammals			
93	Indigenous	Ground Squirrel	Least Concern (LC)	temperate environments - ground	colonies of varying sizes
94		Small spotted genet	Least Concern (LC)	drier districts of southern africa - trees and holes in the ground	solitary
95		Serval	Least Concern (LC)	savanna - mountanous areas	solitary and nocturnal
96		Caracal	Least Concern (LC)	woodlands, savannas and semi-deserts	solitary and occasional pairs, noctural
97		Porcupine	Least Concern (LC)	forests, deserts and rocky outcrops - nocturnal forrager	
98		Honey badger	Least Concern (LC)	live alone in self dug holes	solitary and occasional pairs, noctural
99		African wildcat	Least Concern (LC)	hilly mountanous landscapes	territorial and solitary
100		Side striped Jackal	Least Concern (LC)	woodland or scrub areas	family group of up to seven individuals
101	Exotic	Margay	Near threatened (NT)		
102		Red Panda	Vulnerable (VU)		
103		Red river hog	Least Concern (LC)		
104		Cameroon pygmy goat	Least Concern (LC)		
105		Yellow armadillo	Least Concern (LC)		
106		Fennec	Least Concern (LC)		
		Mammals			
107	Indigenous	Cheetah	Vulnerable (VU)	dry, open areas such as savannas and grasslands	females are solitary, males may form groups of two or three
108		African wild dog	Endangered (EN)	savanna and arid zones	packs ranging from 2 - 27 individuals
109		African civet	Least Concern (LC)	dense vegetation	solitary
110		Burchells plain zebra	Least Concern (LC)	savanna and grasslands	social herds
111		Hartmann's mountain zebra	Vulnerable (VU)	arid conditions and steep mountains	small groups of 7 - 12 individuals
112		Lion	Vulnerable (VU)	savanna grasslands	complex social unit called pride or solitary
113		Cape Buffalo	Least Concern (LC)	swamps, floodplains and grasslands	variable herd size and hierachy
114		African Elephant	Vulnerable (VU)	dense forests, woodlands, scrub and deserts	large herds led by a matriach
115		African Leopard	Near threatened (NT)	mountanous forests and grasslands and savannas	solitary
116		African Hippo	Vulnerable (VU)	territorial in water, feed on land	not social but co-exist in pods up to 100 hippos

Conservation Status

The most widely recognised international conservation status ranking system is the IUCN Red List of Threatened species. This classification system categorises groups of animals/ species into nine groups after assessment of their population size, geographic distribution, distribution fragmentation and rate of decline. The nine categories are as follows:

- Extinct (EX)
  – no known individuals remaining
- Extinct in the wild (EW)
  – known only to survive in captivity
- Critically endangered (CR)
  – extremely high risk of extinction in the wild
- Endangered (EN)
  – high risk of extinction in the wild
- Vulnerable (VU)
  – high risk of endangerment in the wild
- Near threatened (NT)
  – likely to become endangered in the near future
- Least Concern (LC)
  – lowest risk, widespread and abundant populations exist
- Data deficient (DD)
  – not enough data to make an assessment of extinction risk
- Not evaluated (NE)
  – has not yet been evaluated

| 72

More than half of the Johannesburg Zoo population is made up of species that do not originate from Southern Africa and are therefore in an artificial or foreign environment and climate. Only a third of these exotic species are considered a conservational risk. Of the remaining species that are indigenous to Southern Africa, approximately one fifth are considered to be at conservational risk. If worldwide trends of increasing poaching, habitat decline and other threatening factors continue to increase as indicated by fig.70 it is likely that these figures will see the majority of zoo species endangered to varying extents in the not so distant future.

Zoos are already a 'safe space' for a number of animal species and their purpose is shifting more and more towards becoming the only platform for the protection and regeneration of wild animal populations. Johannesburg Zoo is already home to a large number of endagered species and it becomes a vital responsibility of the zoo to provide comfortable and natural living conditions for these animals so that wherever possible the animals can breed and augment wild populations.

Figxx, IUCN Red List index of species survival - showing the steady decline in the international populations of corals, birds, mammals and amphibians, www.iucnredlist.org/about/summary-statistics

117		White Rhinoceros	Near threatened (NT)	grassland and savanna habitats	crashes of up to 14 individuals, usually mostly female
118	Exotic	Capybara	Least Concern (LC)		
119		Asiatic Water Buffalo	Endangered (EN)		
120		Spectacled bear	Vulnerable (VU)		
121		Brown bear	Least Concern (LC)		
122		Puma/Mountain lion	Least Concern (LC)		
123		Siberian tiger	Endangered (EN)		
124		Bactrian camel	Critically endangered (CR)		
125		Striped Hyena	Near threatened (NT)		
126		Pygmy Hippo	Endangered (EN)		
		Antelope			
127	Indigenous	Roan antelope	Least Concern (LC)	woodland, grasslands, savanna and shrublands biome	harem groups of 5 - 15 with a dominant male
128		Kudu	Least Concern (LC)	woodland	female groups of 6 - 10 with solitary males
129		Gemsbok	Least Concern (LC)	arid desert regions	herds of 10 - 40 animals
130		Giraffe	Least Concern (LC)	savannas, grasslands and open woodlands	undefined groups
131		Springbok	Least Concern (LC)	dry, inland areas	large herds
132		Southern reedbuck	Least Concern (LC)	moist grass or reedbeds, extremely territorial	pairs or alone
133		Grey duiker	Least Concern (LC)	savanna and hilly areas	pairs
134		Nyala	Least Concern (LC)	dense woodlands and thickets	social herds
135		Eland	Least Concern (LC)	savanna and plains	large herds
136		Waterbuck	Least Concern (LC)	scrub and savanna areas along rivers, lakes and valleys	herds of between 6 - 30 animals
137		Bushbuck	Least Concern (LC)	forests, forest-savannas and woodland areas	small groups
138		Bontebok	Least Concern (LC)	fynbos and renosterveld areas	male or female exclusive herds up to 40 individuals
139		Sable antelope	Least Concern (LC)	wooded savanna	herds of 10 - 30 with a dominant male
140		Impala	Least Concern (LC)	savanna grasslands and woodlands	territorial males, female herds and bachelor herds
141	Exotic	Axis deer	Least Concern (LC)		
142		Arabian Oryx	Extinct in the wild (EW)		
143		Scimitar horned Oryx	Extinct in the wild (EW)		
144		Giant Eland	Least Concern (LC)		
145		Blackbuck	Near threatened (NT)		
146		Sitatunga	Least Concern (LC)		
147		Bongo	Near threatened (NT)		

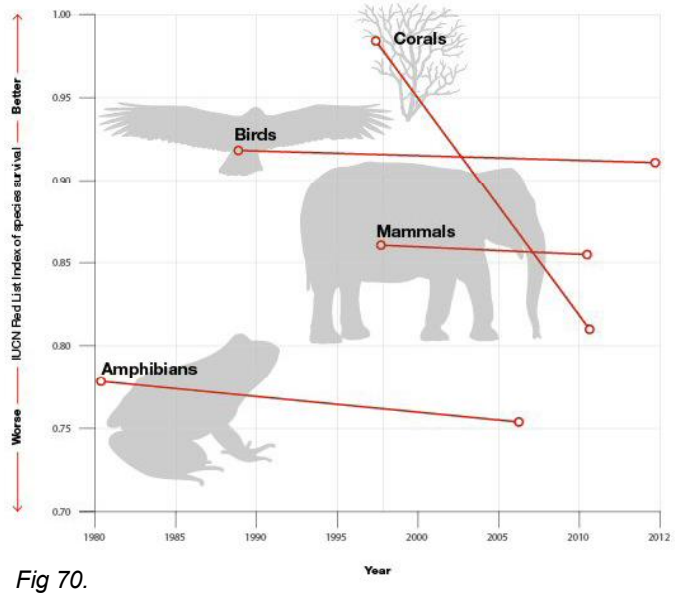
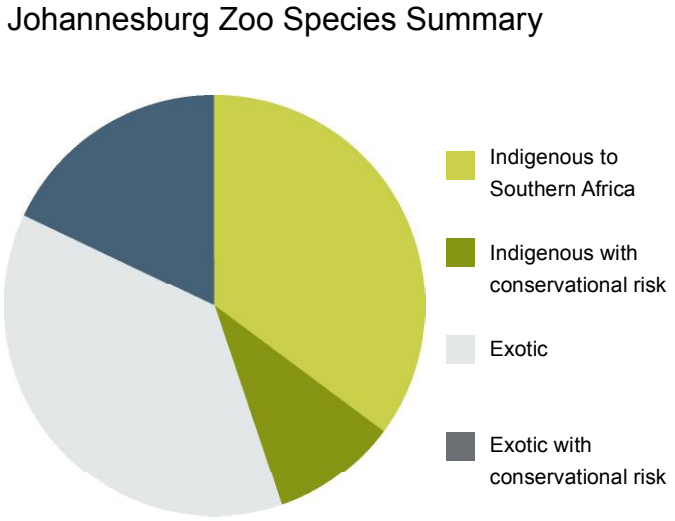


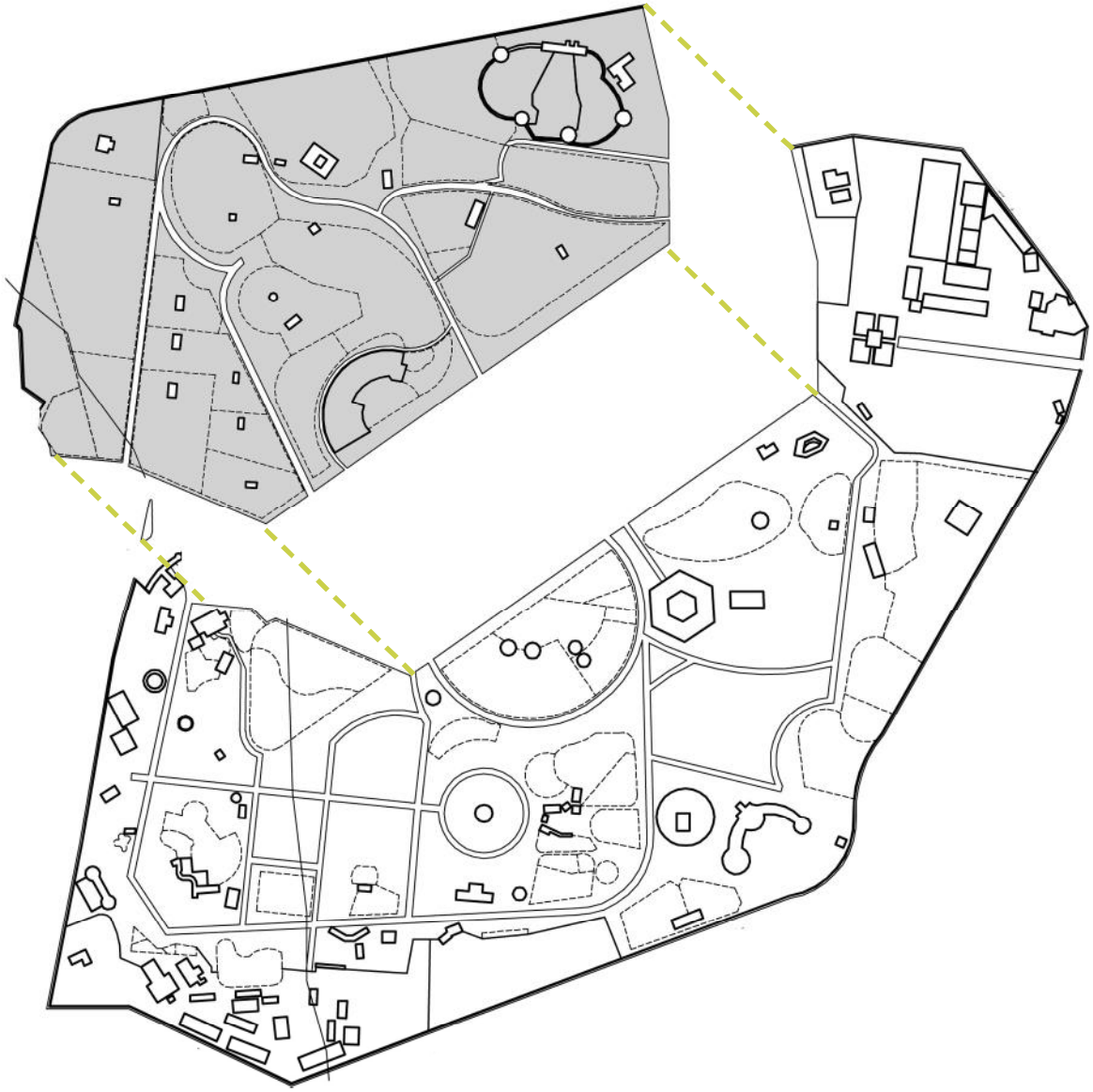
Fig 70.



PLACEMENT OF INTERVENTION

Motivation for specific site selection

- Utilisation of the zoo boundary which overlaps with zoo lake as an exposure opportunity.
- Restructuring possibilities without fundamental disruption of the protected historical layout.
- Opportunity for re-establishment of historical axis from Rand Regiments Memorial which has fallen away.
- Mostly indigenous animal occupants which can be compatible in mixed enclosures.
- Close association with one of the entrances to the zoo grounds.
- Large enough intervention area to make a fundamental impact on the overall zoo, whilst still complementing existing zoo logic.
- Presence of the giraffe houses as a design opportunity for the re-purposing of historical zoo architecture.
- Siting of the wetland project which can be augmented as an educational tool.



Zoo Logic



As per the analysis of the zoo's logic this section of the zoo contains two feature exhibits (Lions and Giraffe) as well as two bathroom blocks and a refreshment store - these components are included as a minimum necessity of functional requirements in the redevelopment scheme to ensure continuity within the zoo logic.

New Enclosures

Large mixed enclosures are possible with groups of indigenous herbivore species. Grouping these animals allows them more space and freedom as well as the benefits of inter-species interaction. This also serves as a step in the direction of the localising of zoo species populations to indigenous species to limit the captivity of exotic animals away from their natural climates and habitats.

Animals included in re-development scheme

Compatible in Mixed Enclosures

- Eland
- Waterbuck
- Cape Buffalo
- Water Buffalo
- Arabian Oryx
- Gemsbok
- Kudu
- Burchell's Zebra
- Hartman's Mountain Zebra
- Giraffe
- White Rhinoceros
- Roan Antelope
- Springbok
- Southern Reedbuck
- Grey Duiker
- Nyala
- Bushbuck
- African Hippopotamus
- Bontebok
- Sable Antelope
- Giant Eland
- Blue Crane
- Pellican







Require Isoalated Enclosures



Nile Crocodile



Lions



Mixed Aviary
- Largest bird: Cape Vulture

Species photographs taken at Johannesburg Zoo, author's own



What is an Unzoo?

Territory

Progressive Zoo Design - The Bronx Zoo

Zoos as an Architectural Typology - London Zoo

Design Brief and Intentions

05 Conceptual Development

WHAT IS AN ‘UNZOO’?

Traditional Zoo

A park displaying live animals from different parts of the world kept in cages or compartmentalised enclosures for people to come and see them, and where they are bred and studied by scientists.

Definition as per article by Jon Coe, www.zoolex.org/

Unzoo Alternative

A place where the public learns about wild animals, plants and ecosystems through interaction with and immersion in original or recreated natural habitats.

The unzoo model seeks to immerse the spectator into the sights, sounds, smells as well as the visual aspects which create the entire ecological picture. Learning is to be initiated by emotional responses such as awe, love, fear and surprise which motivate the viewer to learn about the subject. Simple structures can keep people in prescribed positions without impeding the movement of the animals. The concept lends itself to larger enclosed areas with mixed but compatible animal species as a more accurate representation of their natural environments.

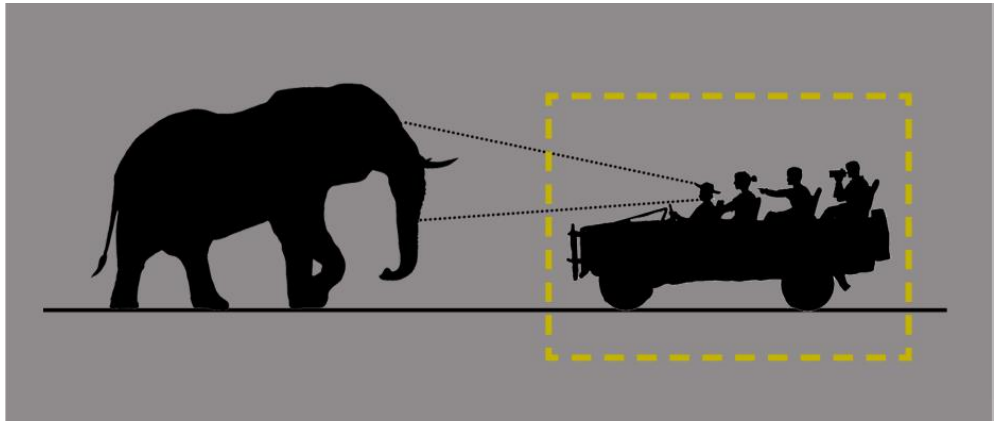
Traditional Zoo	Unzoo
Animals separated by physical barriers such as cages or enclosures	No cages with minimal large scale enclosures, physical built form is occupied by people
Animals are coerced for display in restricted enironments	Display is naturalistic and visibility is controlled by animals themselves
Managed captive animals	Managed free roaming rehabilitated and wild animals
Animals are forced to abide by human schedule	People adapt to animal’s natural schedule
Capital Intensive	Staff intensive



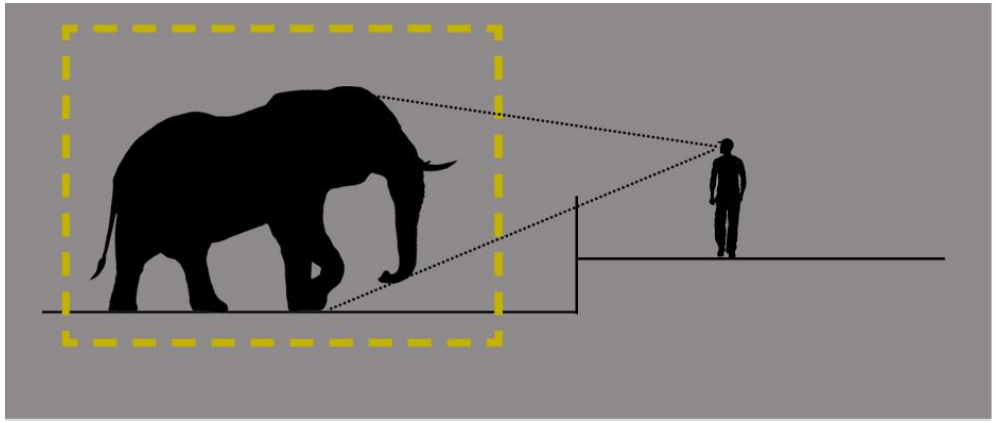


A Change in Viewpoint

The main principle of the unzoo concept is a change in viewpoint as illustrated in concept by the following diagrams.



Game Reserve / Safari Park
This is the most ideal environment for animals as the closest environment to the truly wild. People are secure in the protection of a vehicle but visits can be costly and require travel.



Traditional Zoo
The spectator is given an authoritative position which can be likened to that of an art gallery or museum and the animals movement is highly restricted.

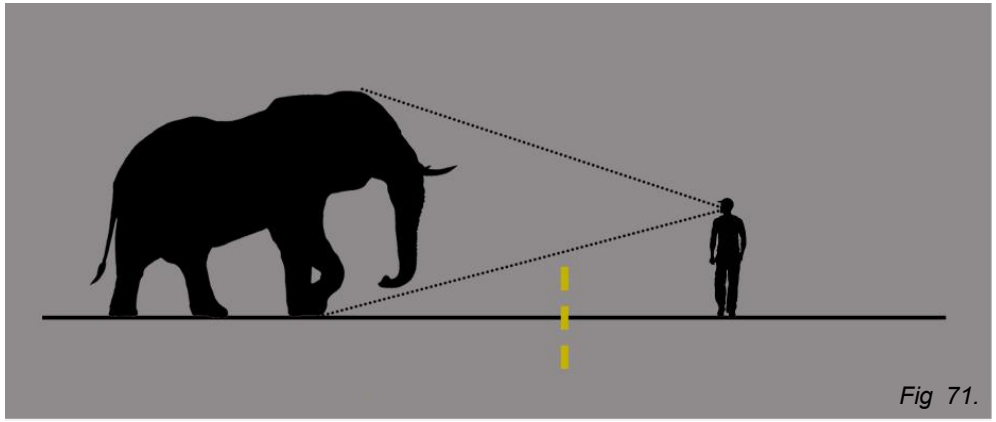


Fig 71.

Unzoo
The animals and people exist in the same environment in which animals are neither isolated nor restricted in movement. Subtle boundary methods keep animals and people separate whilst allowing a variety of sensory experiences.

TERRITORY

In Favour of Larger Zoo Enclosures

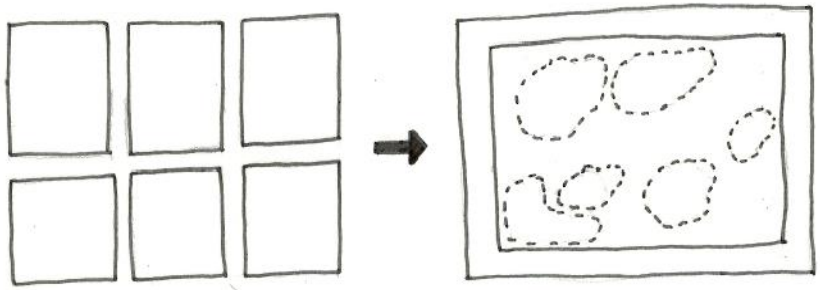


Diagram: combination of isolated enclosures in large mixed enclosure

Wild animals are rarely permanent fixtures in any one place, their existence in a space is transient. Through the various forms of wildlife management, movement is a key liberty which we restrict in our efforts to protect them. No recreation, imitation or enclosure of nature could ever match up to the genuine freedom animals experience in the wild. Phillip Ursprung (2002, p32) noted, “It is impossible to incorporate nature into a building. By Exhibiting nature and architecture in juxtaposition to each other, the vulnerability of both becomes evident”.

People rely of physical boundaries for the designation of space and function whilst animals define their territories through the use of scent and sound. Imposing our human logic of physical division through the use of walls, barriers and other boundaries impacts the behavioural integrity of animals particularly with regards to social structure. It can therefore be argued that should the necessity for the enclosure of animals into human realm arise, such as the case of a zoo, a balance needs to be achieved between the permanence of human infrastructure and the transitory nature of animal habitat.

Most wild animals are biologically territorial. They actively defend their selected area as humans do their assets. These territories are not fixed but rather occupied for a time when they can be depended upon for the provision of resources and relative safety (Giuggiolio et al, 2011).

The spatial limitations of an urban zoo places a huge restriction on the opportunity for the formation of natural territories, however there is a small scope for improvement from the traditional zoo model. The isolation of species from one another coupled with the steady provision of food negates an animals need to identify and manage a territory. Through the provision of larger enclosure spaces with varied terrain and mixed species occupants a social dynamic (albeit micro compared to the wild) begins to exist. An opportunity for increased movement and the formation of micro-territories within a larger enclosure promises to restore some of the natural order of zoo animals.

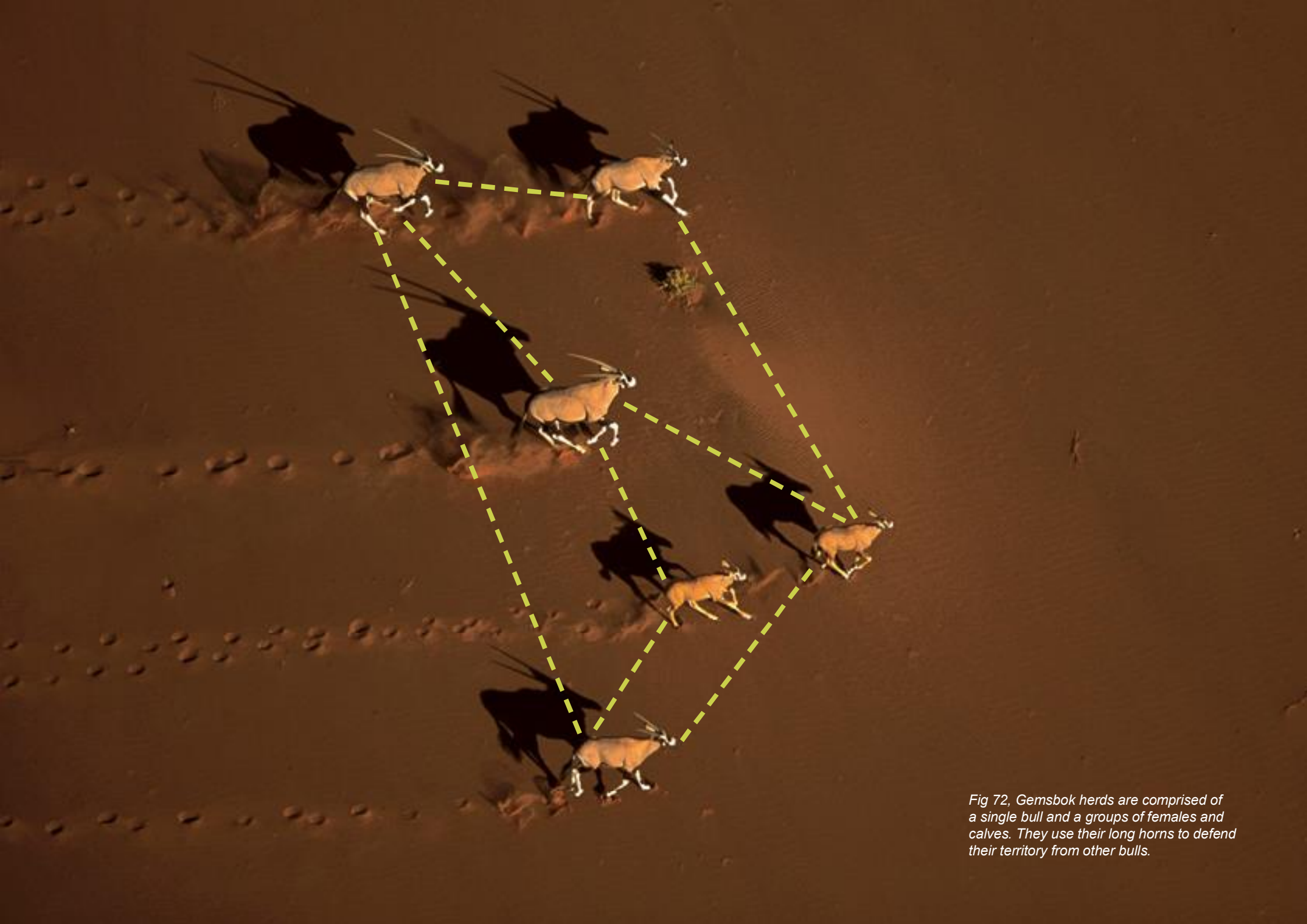


Fig 72, Gemsbok herds are comprised of a single bull and a groups of females and calves. They use their long horns to defend their territory from other bulls.

UNZOO - PROGRESSIVE ZOO DESIGN

The Bronx Zoo has been at the forefront of contemporary zoo design for many years. In many cases the Bronx Zoo has adopted new ways of thinking and made alterations to the zoo grounds and spectator experience well before the concepts in question were considered the norm or implemented in other zoos. It is through this forward thinking and open minded attitude that the Bronx Zoo has earned itself a reputation as one of the world's top zoological gardens when it comes to conservation and spectator experience (Osterhout, 2009).

The Bronx Zoo is perhaps the best precedent for the notion of the 'Unzoo' alternative to traditional zoo design. Concepts of large mixed enclosures and spectator immersion have been implemented at the zoo for a number of years, well before conservational ideas became an international trend. As a result the zoo achieves an effective yet subtle balance between captivity and the wild making it one of the most powerful tools in conservational education.

Fig 73, Bronx Zoo Immersion Exhibit, www.reynoldspolymer.com

PRECEDENT STUDY: The Bronx Zoo

The zoo layout as shown below is comprised of four separate zoos and an aquarium which can all be accessed independently of each other. The grounds are so expansive that it is almost impossible to see the entire zoo in a single day. Each of the large zoo enclosures is intended to imitate the natural habitat of its inhabitants and create a comprehensive representation of ecosystems. Each of the sections offers a different spectator experience in the form of monorails, cable cars, pedestrian walkways on land and above ground creating a sensory playground for zoo visitors.



Fig 74, Map of the Bronx Zoo, www.bronxzoo.com

PRECEDENT STUDY: The Bronx Zoo



Fig 75. Original Lion House design by Lafarge in 1903, www.architectmagazine.com



Fig 76. Refurbished Lion House, 2012, repurposed as a more suitable Madagascar exhibit www.architectmagazine.com

History

In 1898 the City of New York allocated over 250 acres of what was the Bronx Park to the New York Zoological Society to establish a Zoological Garden. From the outset the zoo's main aim was the preservation of indigenous animals, education and the promotion of zoology. The zoo was opened in 1899 and still today remains as one of the largest zoos in the world (New York City Parks). The zoo is run by the Wildlife Conservation Society and it supports conservation programmes both within the zoo grounds and in other wilderness areas including parts of Africa. The architectural landscape of the zoo has a number of heritage protected buildings designed by the like of Heins and Lafarge. As is the case with many zoos these original buildings have outgrown their original functions and have been repurposed in favour of more contemporary zoological solutions (Whitcomb, 2010). 1916 saw the opening of the first fully equipped animal hospital at the Bronx Zoo, this was the first of its kind in the world and the health centre now serves over 15000 animals from the four major zoos in New York. The zoo also played a prominent role in replenishing wild animal populations in Europe after the end of world war one. The Bronx Zoo has pioneered the way in progressive conservation with the opening of the Africa Plains exhibition in 1941 which was the first exhibit of its kind that allowed people to view predator and prey in a naturalistic environment (Osterhout, 2009). All of the exhibits at the zoo are designed in favour of animal comfort and education, as a result a variety of sensory experiences are available throughout the zoo grounds immersing visitors in water, ground, rocky mountains and trees to ensure a representation as realistic as possible to naturally occurring habitats.



Fig 77. The monorail in the Wild Asia exhibit, www.bronxzoojeffdempsey.com



Fig 78, Giraffe enclosure at the Bronx Zoo, www.usmagazine.com

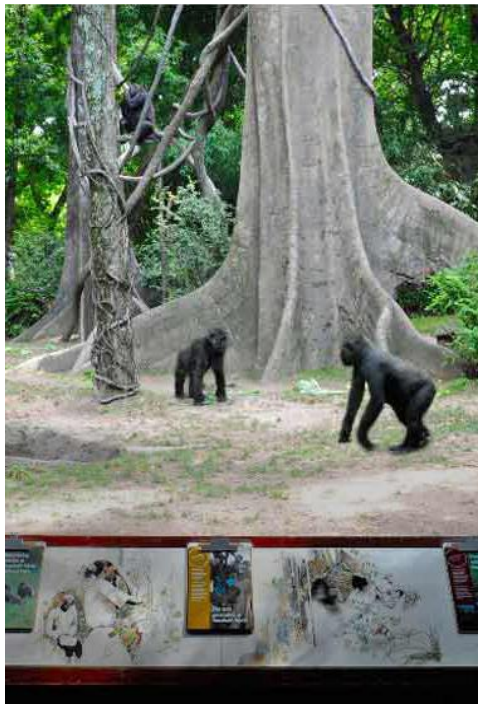


Fig 79. Gorilla immersion enclosure, www.blooloop.com



Fig 80. Immersion enclosure under raised walkway, www.helpern.com

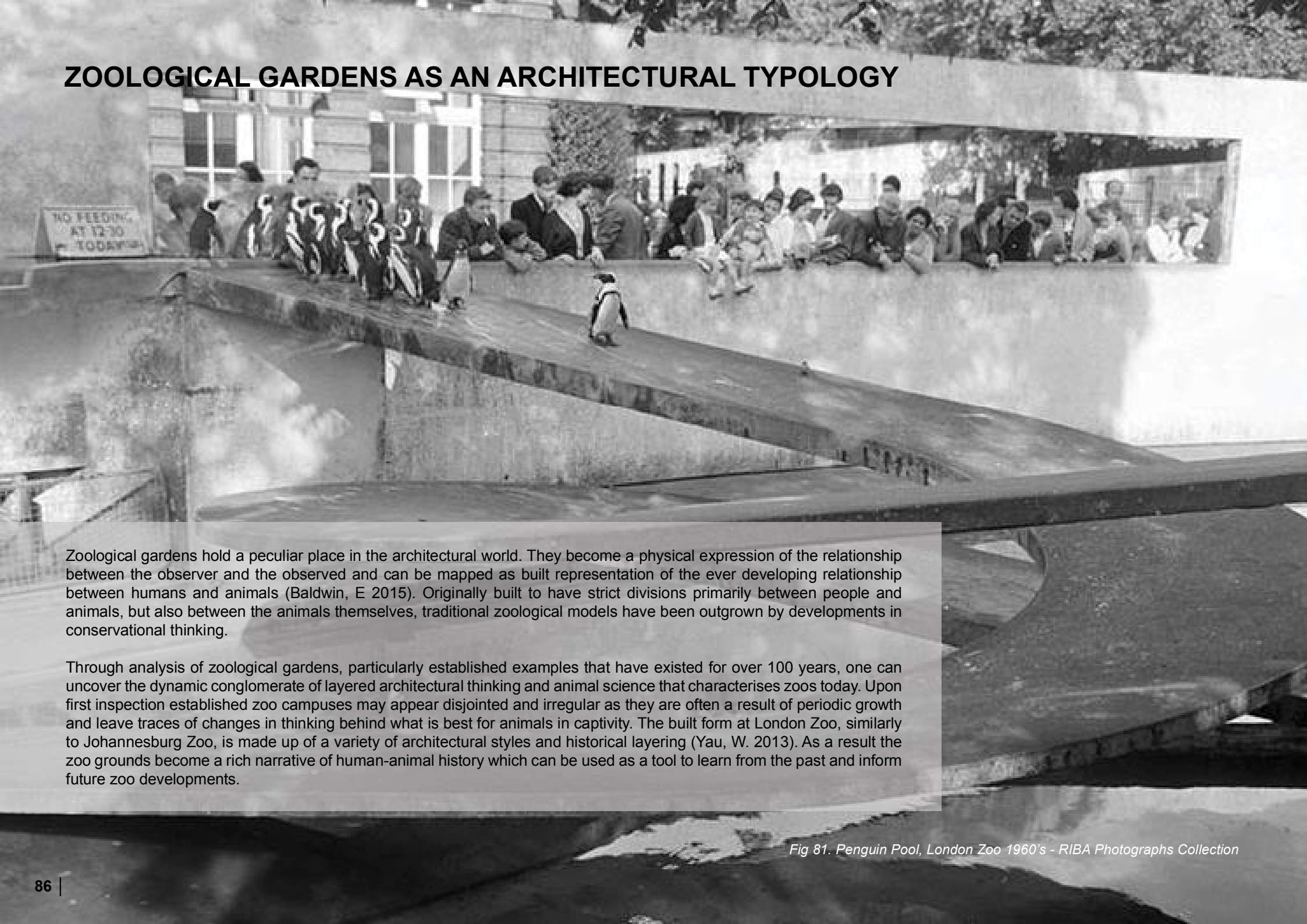
Experiences at the Bronx Zoo

The spectator experience at the Bronx Zoo is varied and exciting for children and adults alike. The zoo boasts a number of activities beyond the animal exhibits such as a 4-D theatre, treasure hunts and a Jurassic park-like dinosaur display. The animal enclosures themselves also exceed the experience of a traditional zoo. Owing to the large scale nature of the 'unzoo' enclosures, creative methods need to be employed in order to ensure visibility and sensory proximity to the animals. The Bronx zoo has over time constructed a monorail, ground-level shuttle train and cable car that winds around the various enclosures over and above the pedestrian walkways which are in part raised above enclosures. These various movement methods ensure universal access to all parts of the zoo whilst creating a dynamic and variable viewing experience. Zoo patrons feel as if they are transported away to the natural habitats of the different animals and as a result become aware of the environment as a whole.

This technique of immersion is successful in both creating better environments for the animals and enhancing the educational experience of visiting the zoo.

The vastness of the grounds of the Bronx Zoo lends itself to the large scale interventions mentioned. The scope of the movement infrastructure is supported by the scale but the principles can be applied at any level or scale. The fundamental concept of a patchwork of naturalistic environments layered with unobtrusive infrastructure for people and observation is a prototype that can be encouraged in all zoo design because of the positive impact it has on conservation and education.

ZOOLOGICAL GARDENS AS AN ARCHITECTURAL TYPOLOGY



Zoological gardens hold a peculiar place in the architectural world. They become a physical expression of the relationship between the observer and the observed and can be mapped as built representation of the ever developing relationship between humans and animals (Baldwin, E 2015). Originally built to have strict divisions primarily between people and animals, but also between the animals themselves, traditional zoological models have been outgrown by developments in conservational thinking.

Through analysis of zoological gardens, particularly established examples that have existed for over 100 years, one can uncover the dynamic conglomerate of layered architectural thinking and animal science that characterises zoos today. Upon first inspection established zoo campuses may appear disjointed and irregular as they are often a result of periodic growth and leave traces of changes in thinking behind what is best for animals in captivity. The built form at London Zoo, similarly to Johannesburg Zoo, is made up of a variety of architectural styles and historical layering (Yau, W. 2013). As a result the zoo grounds become a rich narrative of human-animal history which can be used as a tool to learn from the past and inform future zoo developments.

Fig 81. Penguin Pool, London Zoo 1960's - RIBA Photographs Collection

PRECEDENT STUDY: London Zoo (Regents Zoo)

London Zoo, opened in 1828 is the world's oldest scientific zoo. The zoo was originally intended as a private institution for the housing of animals for the purpose of scientific study but was opened for public visitation in 1847.

Similarly to Johannesburg Zoo, the London Zoo is situated within the greater extents of a public park. On the northern edge of Regents Park, the zoo becomes the boundary between the park and the city with further grounds acquired at a later stage for expansion.
The zoo grew over a number of years through many small and large-scale decisions to add new staff, collections and facilities (Yau, W. 2013). Decimus Burton was appointed as London Zoo's first official architect who was responsible for the original site layout as well as key buildings such as the Clock Tower, Raven's Cage and Giraffe House. As advances were made in the fields of conservation and animal husbandry certain buildings in the zoo were no longer deemed satisfactory to perform their original functions – some of Burton's buildings are described in the present day as "follies set in an elegant garden for entertaining curiosity" (Guillery,P. 1993 p.3).

1913 saw some major addition to the Zoo with the bold architectural statement created by the Mappin Terraces. Constructed at a time when concrete was still a relatively new material the zoo became a platform for architectural innovation (Building News, 1913). The advances in concrete technology meant that the structures could be water tight and allowed for the first water conscious exhibit in the zoo collection. The exhibit was originally designed as a habitat for bears, goats and deer but current thinking has deemed the enclosure more suitable for wallabies and emus. This repurposing of original buildings can be noted as a frequent occurrence in the infrastructure of both London and Johannesburg zoos as the original intention is overruled by contemporary opinion the zoos are required to be dynamic and flexible to keep up with the on-going advances in animal science.

Other notable additions to the London Zoo include the Round House (1933) intended to house gorillas and Penguin pool (1934) both designed by Berthold Lubetkin. The zoo additions were again a platform for innovative architectural style and have been noted as some of the first modernist style buildings to be built in Britain (Yau, W. 2013). As in the case of the Mappin Terraces the buildings were at a later stage deemed unsatisfactory for their original use and were repurposed in 2004.

The elephant and rhinoceros house (1964) designed by Sir Hugh Casson and Neville Conder are an example of yet another architectural style in the zoo grounds. These brutalist style enclosures were designed as a statement of the enormity and strength of the elephant and the rhinoceros (Yau, W. 2013). These buildings are still in use today and provide another layer of historical richness to the architectural zoo experience.



Figure 82, Giraffe House, www.nationalgeographic.com



Figure 83, Mappin Terraces, www.richardwhitby.net



Figure 84, Elephant and Rhinocerous House, www.pastscape.org.uk

PRECEDENT STUDY: London Zoo (Regents Zoo)

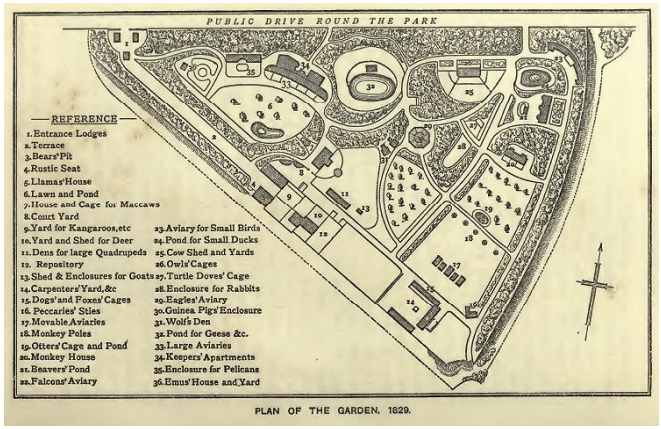


Figure 85, Plan of London Zoological Gardens 1829 www.mikeparsons.org.za



Figure 86, Plan of Johannesburg Zoological Gardens 1920's Johannesburg Heritage Council Archives

Original mapping of London Zoo (left) and Johannesburg Zoo (right) which show similarities of form and layout principles in line with the traditional thinking of the time. Both facilities border onto public parks and have in their life times expanded into those areas. The traditional garden style layouts of both zoos remain as circulation informants today whilst a large amount of the built form has changed.

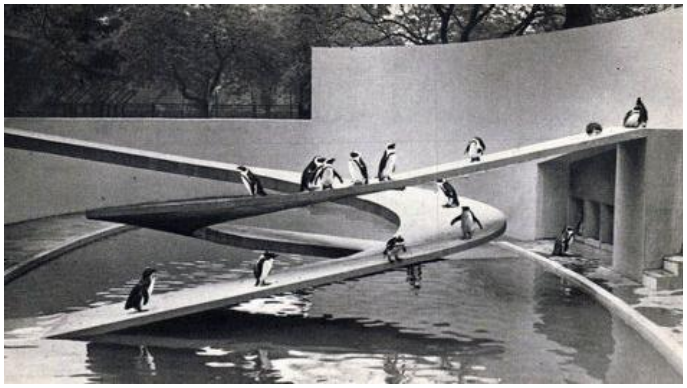


Figure 87, Original Penguin Pool, www.architectuul.com



Figure 88, Penguin Pool repurposed as a bug sculpture exhbition by artist Lawrie Simonson, www.telegraph.co.uk

As a public institution the success of any zoo rests of the public opinion thereof. Should the zoo fall out of favour with the public it is certain to face great financial troubles as the London Zoo did in the 1980's. An increased public awareness of conservation and animal cruelty resulted in a drastic decline in visitor numbers as people were not happy with the cramped conditions that the animals were kept in. The zoo was set to close in 1991 but was saved by the support of public donations on condition of the enormous task of restoring its buildings and providing more suitable habitats for its animals.

The current projects at the London Zoo such as the new Lion enclosure set to open in 2016 are designed to be the forefront of contemporary conservational thought but there is no doubt that 50 years from now further advancements will be made in the field and even these new developments will become a platform for possible improvements. The London zoo, like the Johannesburg Zoo provides a very clear example of the versatility necessary for the survival of the zoological gardens as a typology. Continuous changes in the zoo's animal population and conservational initiatives result in a dynamic architectural patchwork that is both a cemetery for notions past and canvas for future thought.

DESIGN BRIEF AND INTENTIONS



Having analysed the existing complexities of the Johannesburg Zoo and understood its functions and layered nature from a perspective of wildlife conservation, the following can be summarised as the primary aims/design brief for a re-development intervention:

- To create a sustainable and naturalistic “unzoo” alternative to the traditional zoological garden model in an appropriate portion of the existing Johannesburg zoo, which is contemporary in conservational thought and dedicated to the responsibilities of a 21st century zoo.

- To integrate the zoo’s functional aims of education, conservation and observation into a seamless visitor experience.

- To maintain the historical narrative that exists within the Johannesburg Zoo, respecting sites of historical relevance through the reallocation of appropriate function for built form.

- To maintain the effective logic of the visitor experience at the zoo whilst enhancing points of interest and augmenting educational opportunity.

- To create an interactive and enticing presence of the zoo on the Jan Smuts Avenue boundary, improving the relationship between the zoo and neighbouring Zoo Lake

.

- To create a tactile and sensory architectural experience that creates an awareness of the surrounding environment and as a result man’s responsibility within it.



Design Process

Programme Development

Programme Massing

Expansion on Programme

06 Design Development

DESIGN PROCESS

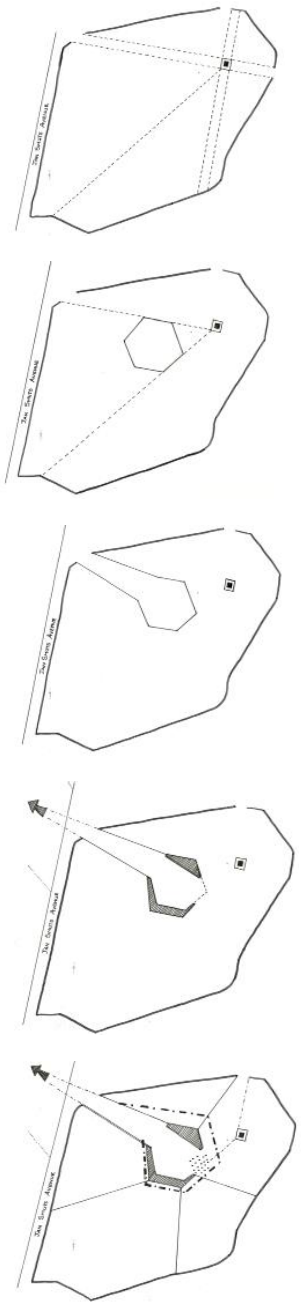
Summary of Design Concept 1

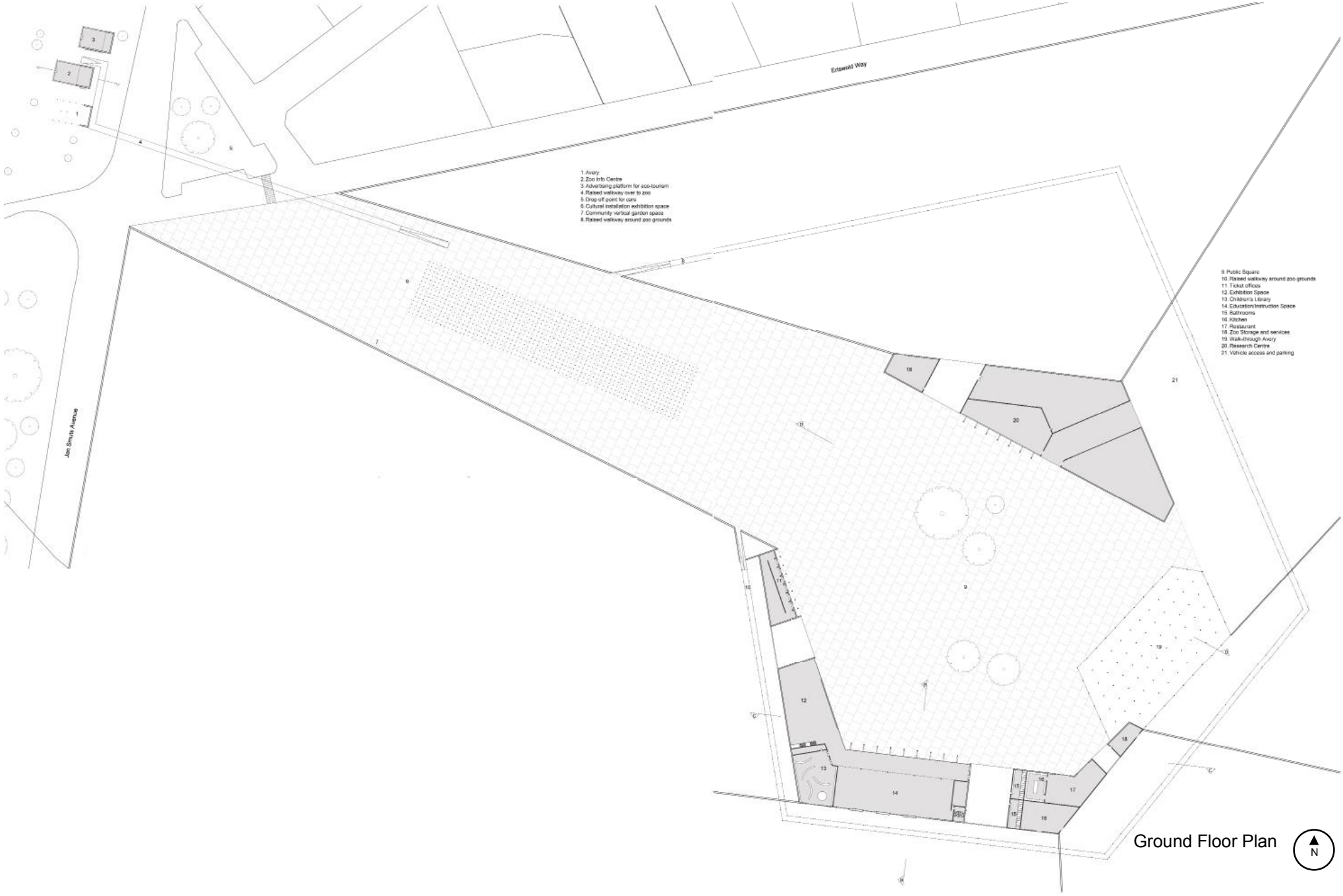
This initial design concept is based on a rethinking of the way in which the zoo currently operates. The zoo landscape is divided into six sections, representative of the six natural biomes in Southern Africa. The built form of the zoo is centralised in a core public area around a central square from which the zoo enclosures can be accessed on safari-like tours. The intervention proposal extends across to Zoo Lake via raised walkways creating an interactive linkage between the two facilities.

Although applicable in concept this initial idea became increasing more unviable upon understanding the complex layered nature of the Johannesburg Zoo. Historical relevance and animal compatibility alone would limit the success of such a scheme which would by its nature only be effective if executed in entirety.

Ideas of the conceptual base of this idea are carried through to the final intervention proposal, only implemented on a more appropriate scale.







Ground Floor Plan

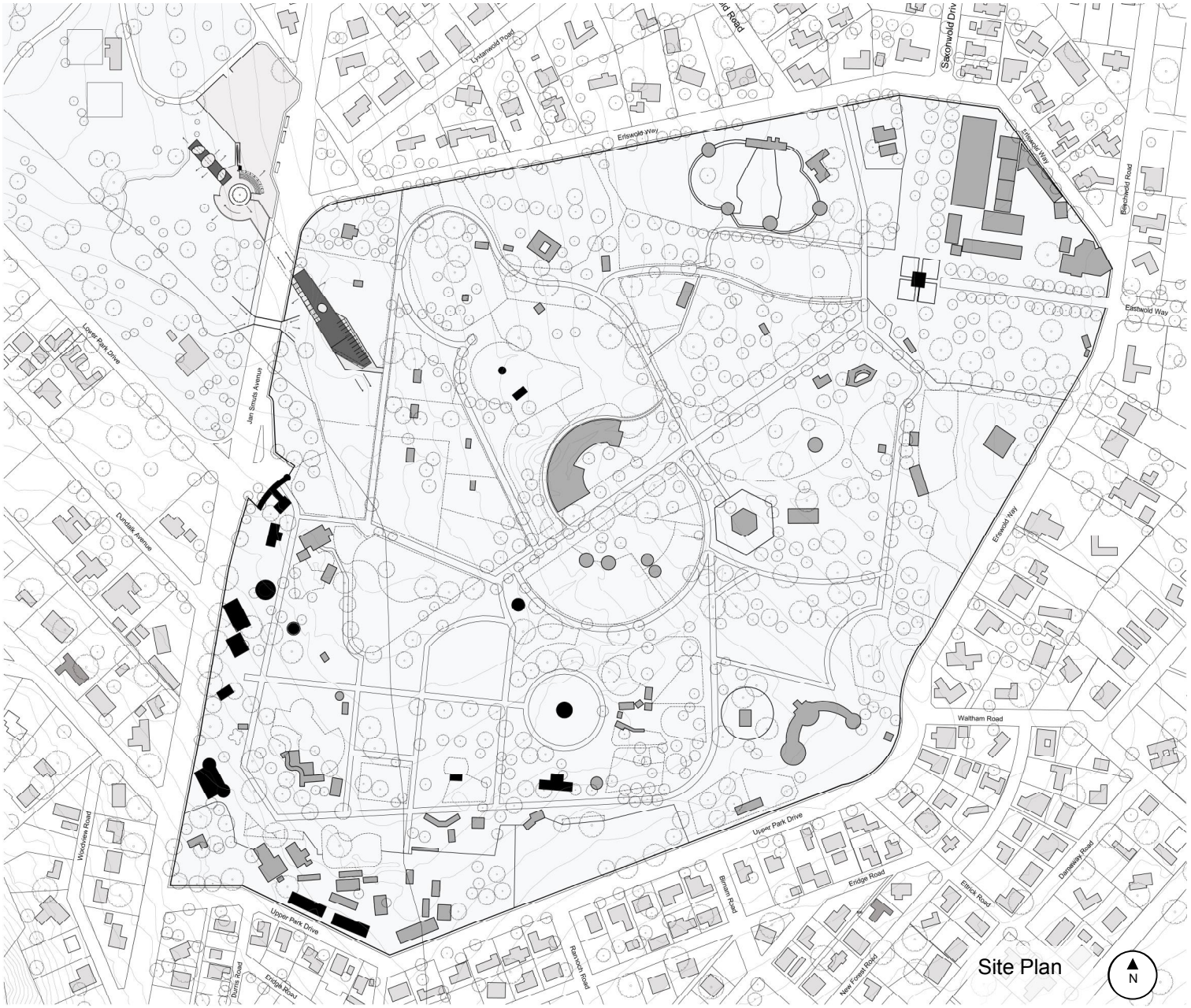
DESIGN PROCESS

Summary of Design Concept 2

A second design concept focused more on integration between the zoo and Zoo Lake which upon further analysis became secondary to the fundamental aims of this thesis. An entrance facility which tunneled underneath Jan Smuts Avenue sought to create an educational entrance experience to the zoo grounds whist exposing some of the zoo functions to the public on the Zoo Lake interface.

Whilst the programmatic structure of the design concept remains relevant to the final intervention proposal, the focus is shifted from the bridging concept to a more internally effective scheme within the zoo grounds. The idea of exposure to the public interface is retained through to the final proposal but treated in a much more subtle and secondary manner to the internal zoo operations.

As a result different aspects of both of these original design concepts are integrated to produce a re-development scheme for a portion of the zoo that is both viable and effective in consideration of the complexities of the current Johannesburg Zoo.





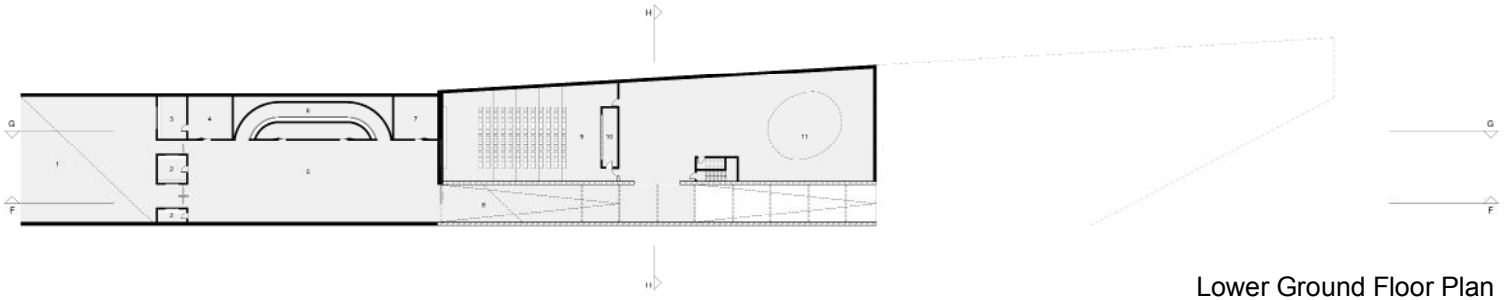
Entrance Ramp



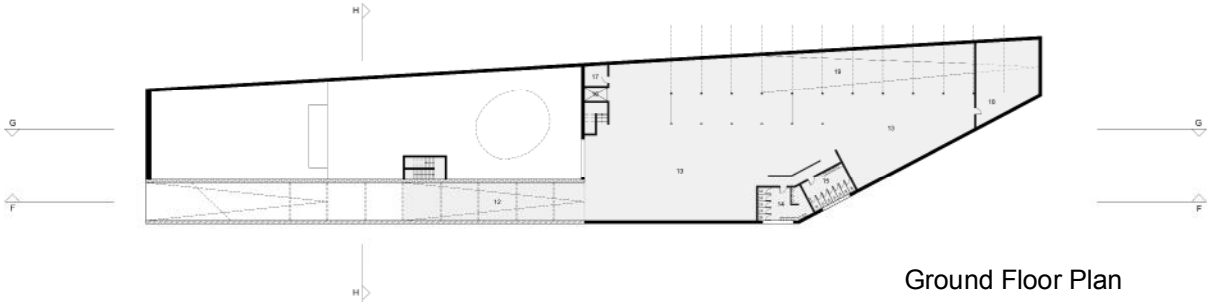
Entrance area



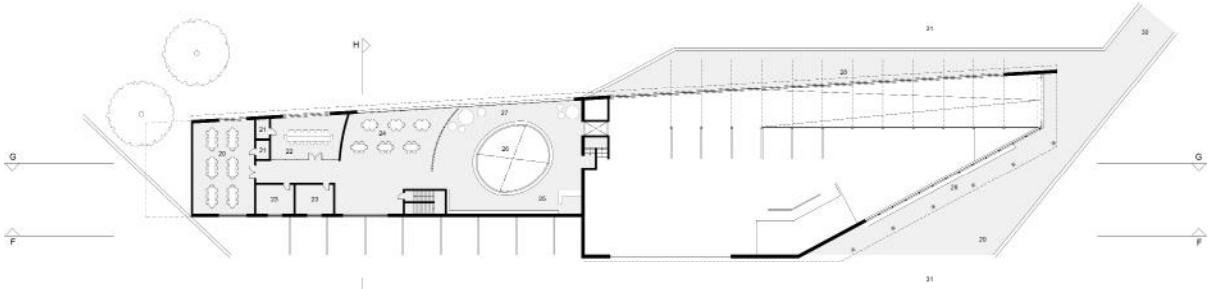
Conservational Gallery



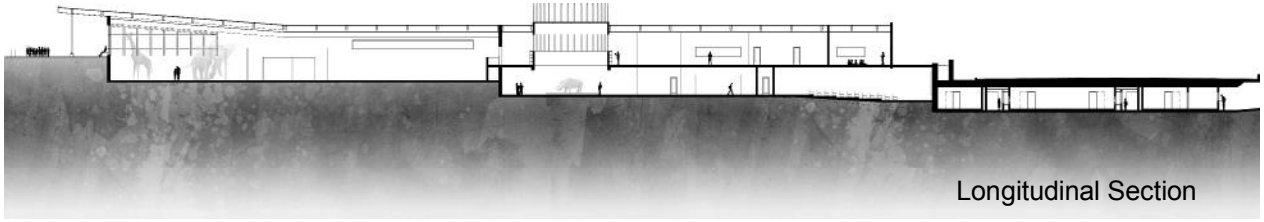
Lower Ground Floor Plan



Ground Floor Plan



First Floor Plan



Longitudinal Section

“Through the night the enchanted owl carries the child to the wonderland of dreams”

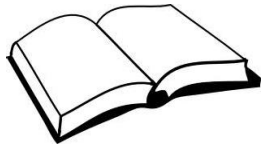
Quoted on a plaque at the Johannesburg Zoo entrance presented to the children of Johannesburg by Alec and Geraldine Gorshel, Mayor and Mayoress of Johannesburg 1959 – 1960.



Fig 88, accessed from www.theguardian.com

PROGRAMME DEVELOPMENT

The proposed intervention programme can be classified into three major categories, Education, Observation and Operation. All three need to work in an integrated manner to ensure the potential benefits of the 'unzoo' concept. The integration of educational features with the primary observation activity associated with a zoo visit, together with the appropriate design of captive animal habitats that endorse conservation are the fundamental aims of this thesis.







Education

The educational aspect of the programme seeks to inform zoo visitors of the ecological relevance of what they are viewing. Providing a further understanding of the environment we live in and the creatures that occupy it become fundamental in creating an international conservational conscience. Allowing the educational aspects to become integrated in favour of the current separate facilities ensures the reaching of a wider audience and an increased scope for educational opportunity.

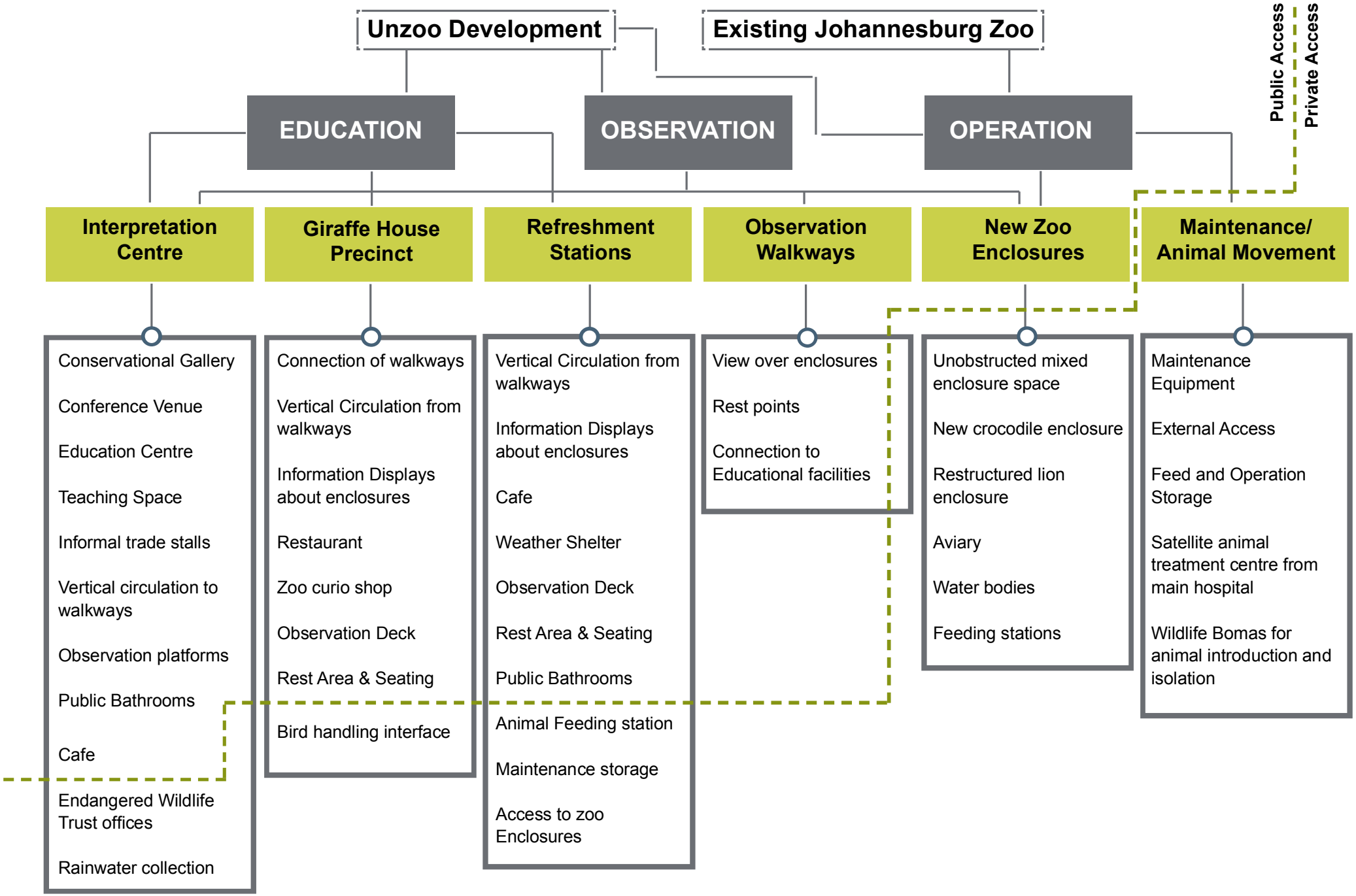
Observation

Observation of wild animals is the primary function of a traditional zoo as the activity that attracts visitors and as a result ensures its purpose. Maintaining a quality platform for the observation of the zoo animals is pertinent to the zoo's success. The provision of new and fresh attractions also becomes important in ensuring return visitors. Any re-development within the zoo needs to hold observation as a key focal point, if not the primary aim, then one of parallel importance.

Education and Observation linked and defined by primary Operation

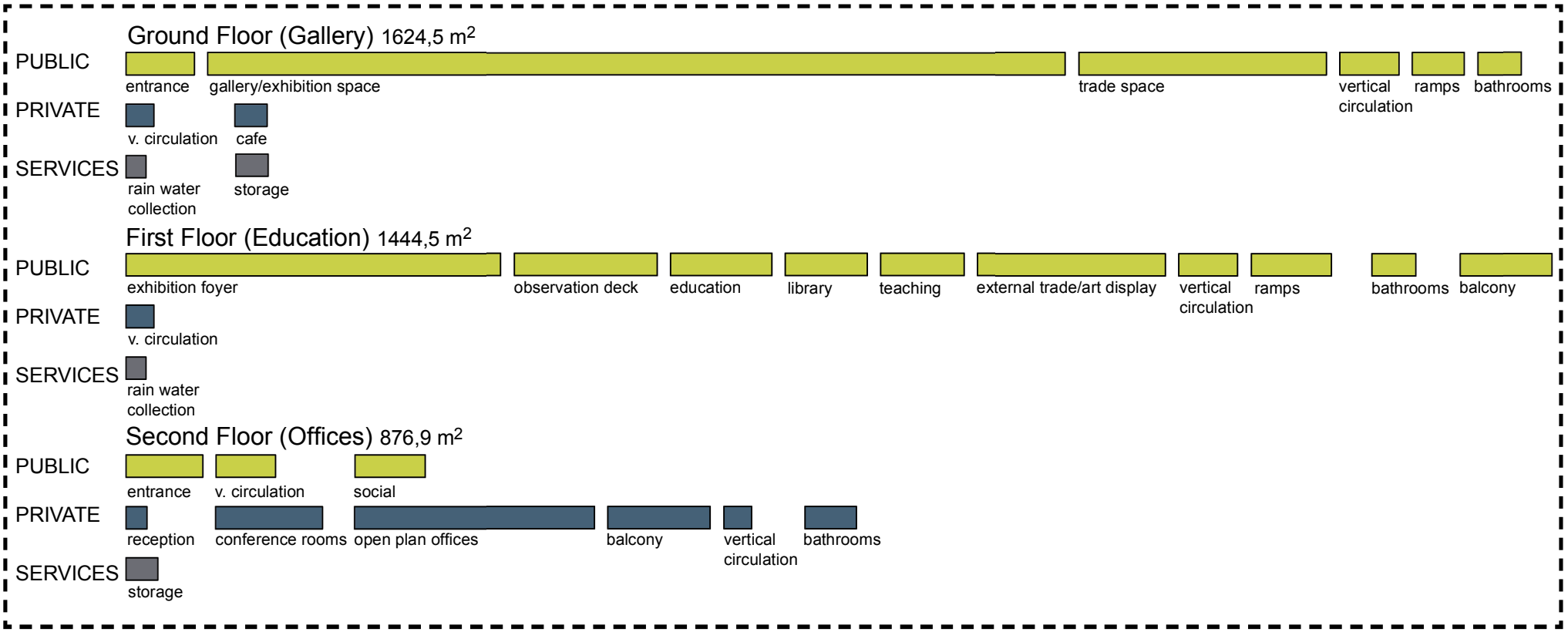
Operation

Maintaining wildlife in a captive area requires extensive management and maintenance. This coupled with the non-public facing functions of conservation such as breeding programmes and animal rehabilitation is a key factor in the design of any zoo. Prioritising animal habitat and making contemporary improvement thereof is a fundamental aim of this thesis and the catalytic function for the re-development proposal.

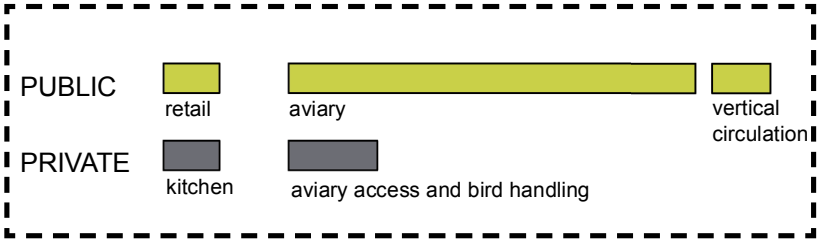

Unzoo Development
Existing Johannesburg Zoo
Public Access
Private Access
EDUCATION
OBSERVATION
OPERATION
Interpretation Centre
Giraffe House Precinct
Refreshment Stations
Observation Walkways
New Zoo Enclosures
Maintenance/ Animal Movement
Conservational Gallery
Conference Venue
Education Centre
Teaching Space
Informal trade stalls
Vertical circulation to walkways
Observation platforms
Public Bathrooms
Cafe
Endangered Wildlife Trust offices
Rainwater collection
Connection of walkways
Vertical Circulation from walkways
Information Displays about enclosures
Restaurant
Zoo curio shop
Observation Deck
Rest Area & Seating
Bird handling interface
Vertical Circulation from walkways
Information Displays about enclosures
Cafe
Weather Shelter
Observation Deck
Rest Area & Seating
Public Bathrooms
Animal Feeding station
Maintenance storage
Access to zoo Enclosures
View over enclosures
Rest points
Connection to Educational facilities
Unobstructed mixed enclosure space
New crocodile enclosure
Restructured lion enclosure
Aviary
Water bodies
Feeding stations
Maintenance Equipment
External Access
Feed and Operation Storage
Satellite animal treatment centre from main hospital
Wildlife Bomas for animal introduction and isolation

PROGRAMME MASSING

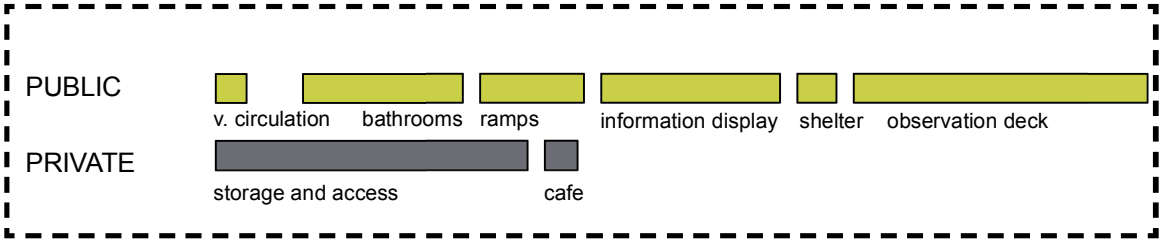
Interpretation Centre 3945,9 m^2



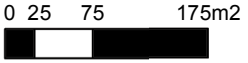
Giraffe House Precinct 571,9 m^2



Refreshment Stations 2080,6 m^2



Total Built Form: 5558,1 m^2



EXPANSION ON PROGRAMME

Education Centre

Education lies at the heart of the aims of the Johannesburg Zoo, as stated in their mission statement. There is currently an active education centre from which numerous educational activities are facilitated. The centre operates out of the historical old tea house which is limited in space and does not effectively function as a teaching facility. Most of the educational activities are child focused, however themed talks and workshops are also hosted for an older audience. Holiday programmes, camp outs, running/walking events together with a variety of loyalty programmes give the education centre a fundamental role in the operation of the zoo.

With the aim of promoting wildlife education further through this thesis, a new education centre facility is included on the first floor of the interpretation centre and is echoed throughout the design intervention. This facility seeks to house the already successful educational programmes run by the zoo and provide a scope for the introduction of more such initiatives. With school groups making up a large percentage of zoo visitors, these facilities also provide a platform from which the zoo can be accessed as a living classroom.



Fig 89, Educational activity adverts accessed from www.jhbzoo.org

Informal Trade

At present there is an active informal trade presence outside the Jan Smuts Avenue entrance to the zoo. Vendors selling goods varying from sun hats to ice creams, balloons and blow-up animals as well as other animal related curios take advantage of the captive market of people entering and exiting the zoo. Many of the toy-like goods are very popular amongst the school groups waiting for bus pick-ups in the drop-off area in front of the entrance.

Part of the re-development programme includes an allocation of space on the street facing portion of the interpretation centre at ground level. This dedicated trade space is intended to augment the existing income opportunity and create a visual interaction between the zoo and zoo lake; enticing people towards the zoo entrance.





Fig 90, Traders outside the Jan Smuts Avenue entrance, author's own

Non-profit Organisation Office Space

Many wildlife-focussed non-profit organisations rely on zoo facilities for the siting of research projects and conservational initiatives. In particular, at Johannesburg Zoo, The Endangered Wildlife Trust is active in conservational breeding programmes. The organisation has a head office in the east of Johannesburg but currently occupies a converted house within the zoo grounds off Erswold Way for the administrative research components.

The new re-development scheme proposes the demolition of the house and inclusion of office space programming into the top floor of the interpretation centre. This not only offers a larger and more suitable working environment but also provides opportunity for the public exposure of the work being done. The inclusion of conference facilities into the office space becomes an income opportunity for the organisation as well as an opportunity for other such organisations to initiate projects within the zoo.

ENDANGERED
WILDLIFE TRUST

www.ewt.org.za



Site Restructuring Principles

Ground Plane

Raised Walkways

Aesthetic Concept

Form Finding

Circulation as Education

Sustainable Features

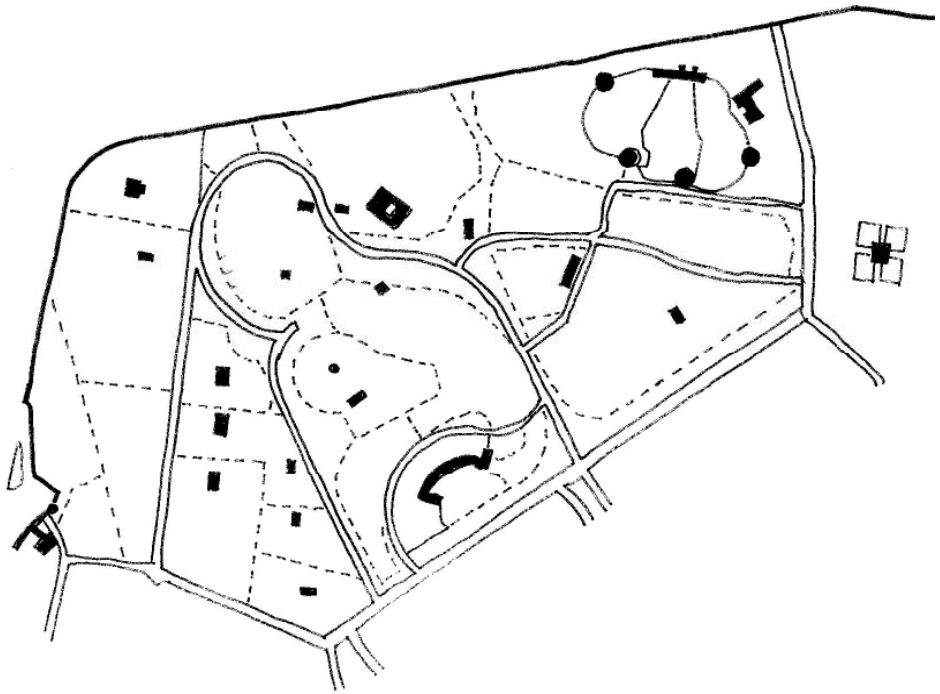
Technical Element

Parking and Accessibility

Project Viability

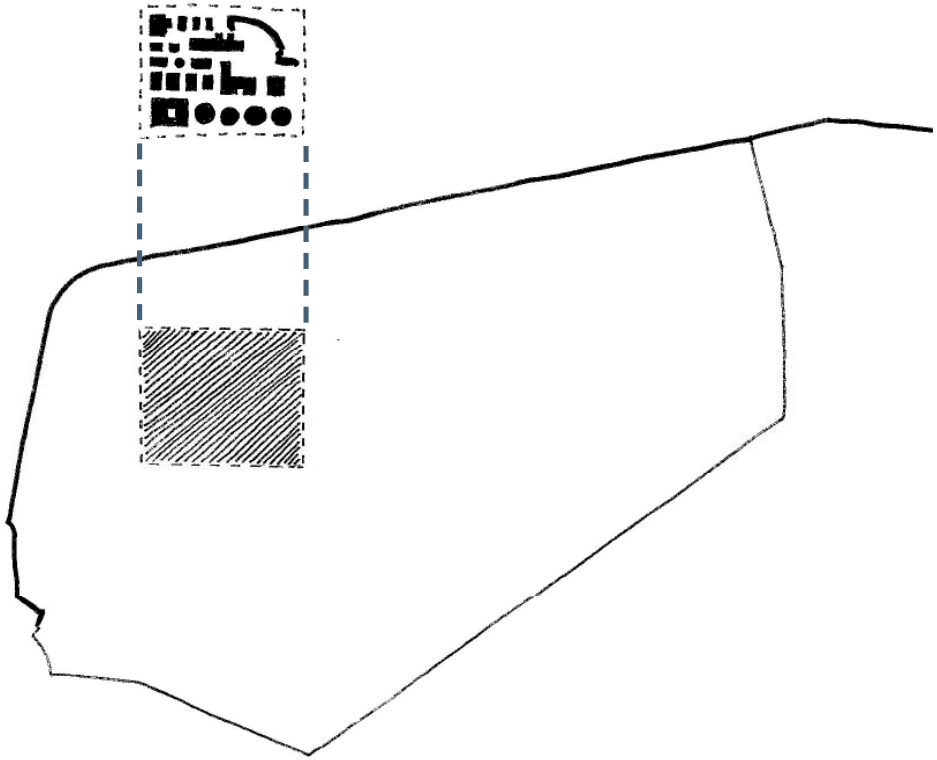
07 | Design Analysis

SITE RESTRUCTURING PRINCIPLES



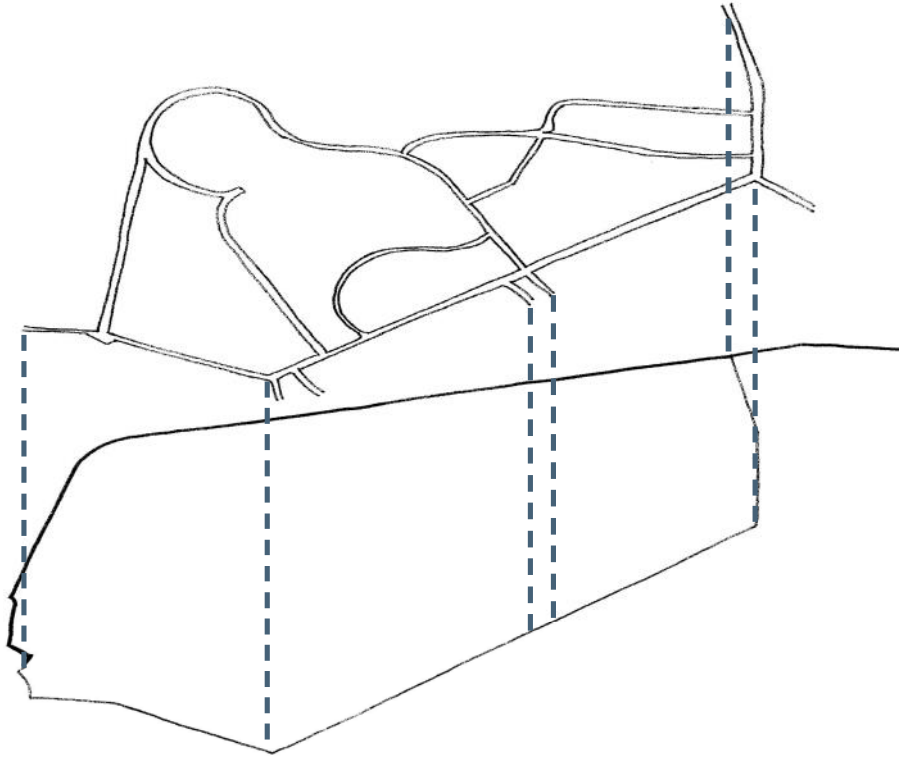
Existing Site

The selected site within the existing Johannesburg Zoo grounds takes on the model of a traditional zoological garden comprised of numerous compartmentalised enclosures separated with an arterial system of ground level pathways which act as further divisions between the cellular animal enclosures. The built form is sporadic and unrelated in both style and placement.



Consolidation

Part of the unzoo concept is the consolidation of the built form into a less scattered footprint allowing for more unobstructed open space to be utilised as animal habitat. As a conceptual representation (above) if all of the existing built form, which is required for the effective operation of this portion of the zoo, is grouped together the resulting footprint allows for substantial expansion and flexibility in the formation of unzoo enclosures.

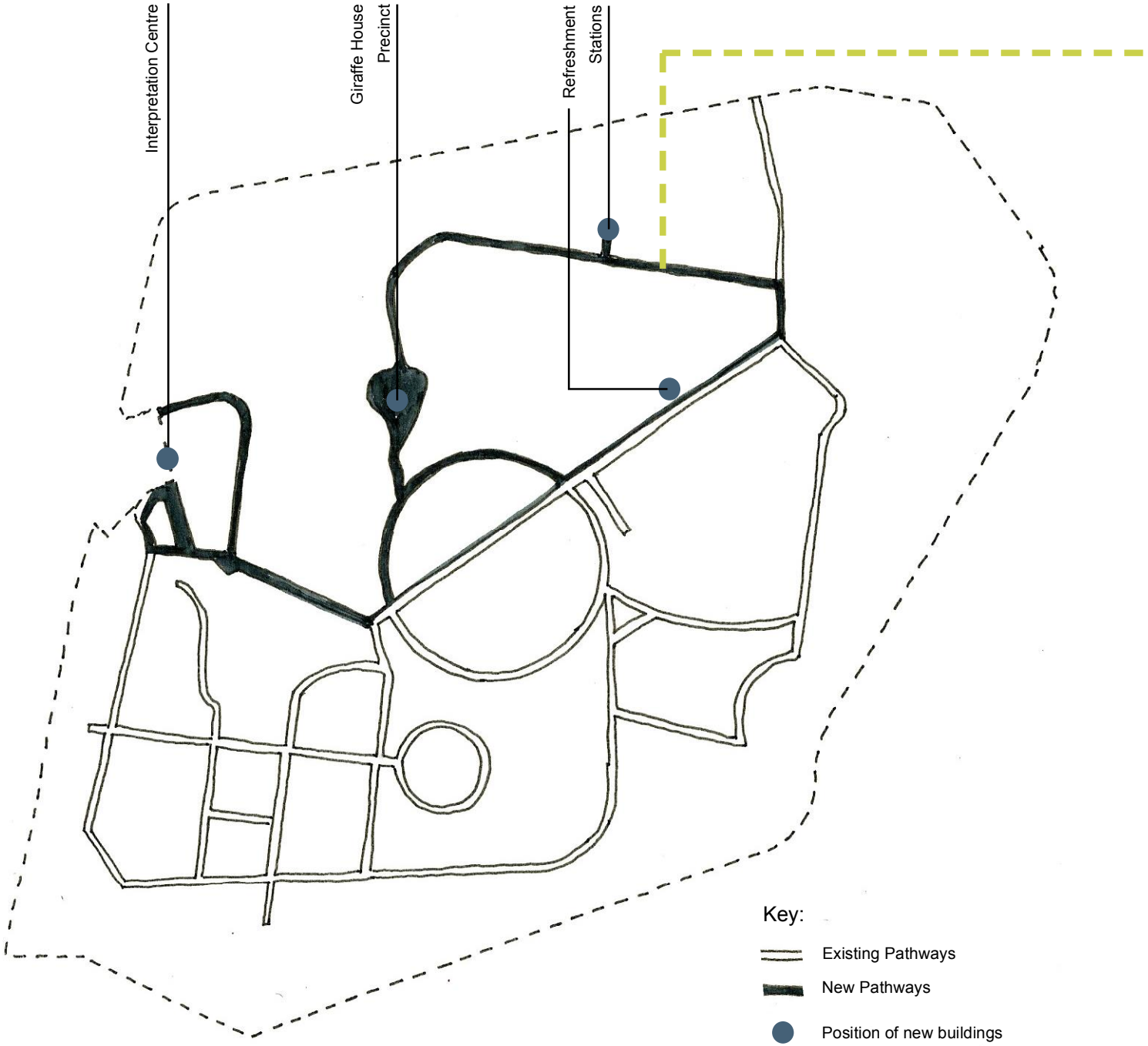


Elevation

Observation infrastructure makes up a fundamental part of the built fabric of zoological gardens. Traditionally these pathways exist on ground level and form part of the divisional grid to separate animals. The concept of prioritising ground level space for animal habitat is central to the unzoo concept which gives rise to the idea of elevated pathways that maintain the scope of observation whist allowing fluidity on ground level.

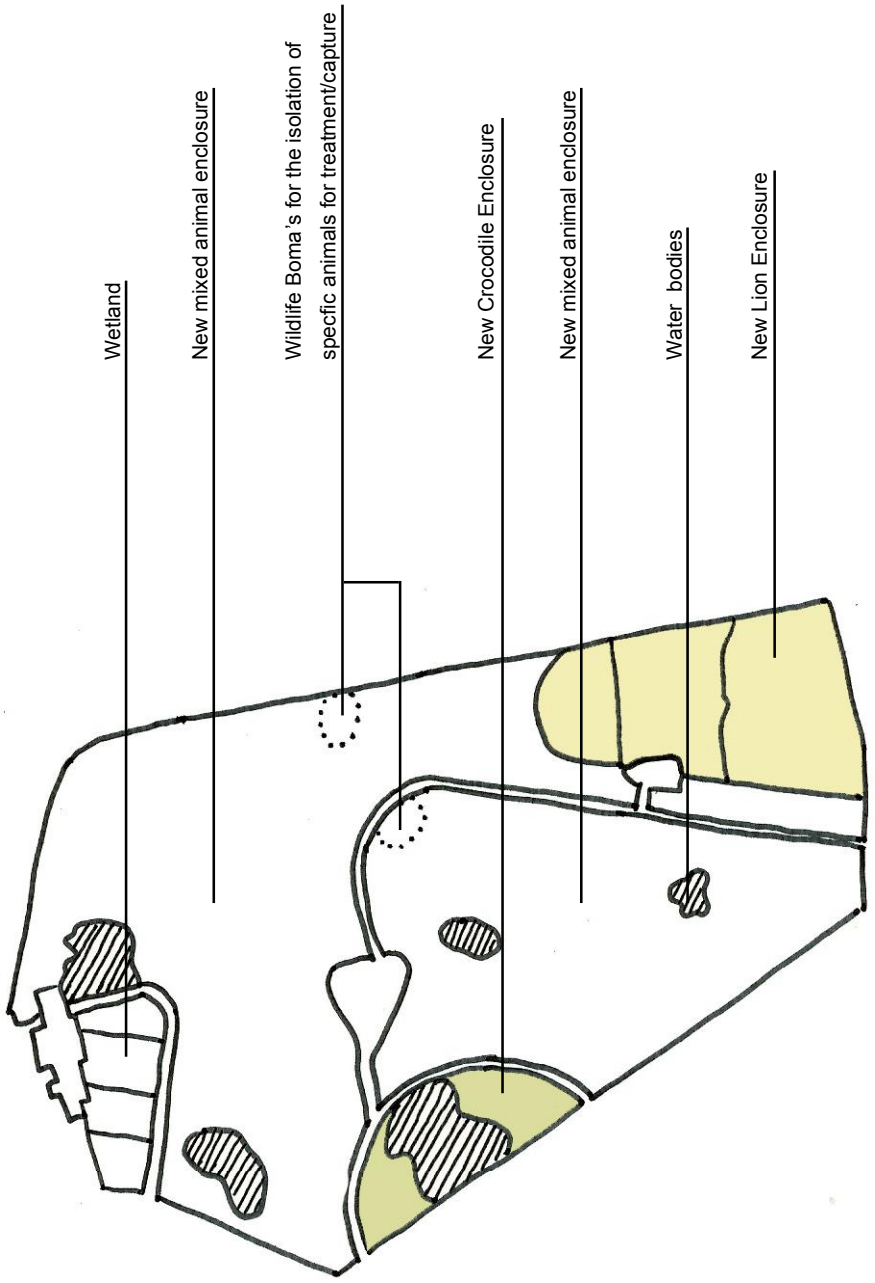
GROUND PLANE

The ground plane is divided into sections by minimal pathways separating the new larger zoo enclosures. The geometry of these pathways is designed to complement the existing geometry of the traditional zoo layout which remains on the southern side of the zoo grounds. The new pathways (highlighted in black), which separate the two primary unzoo enclosures, respond in a symmetrical manner to the existing walkways, mirrored with a circular and triangular form across the main boulevard which runs through the centre of the zoo. All of the new pathways connect to the inlets of exiting pathways to maintain uninterrupted movement logic across the entire zoo.





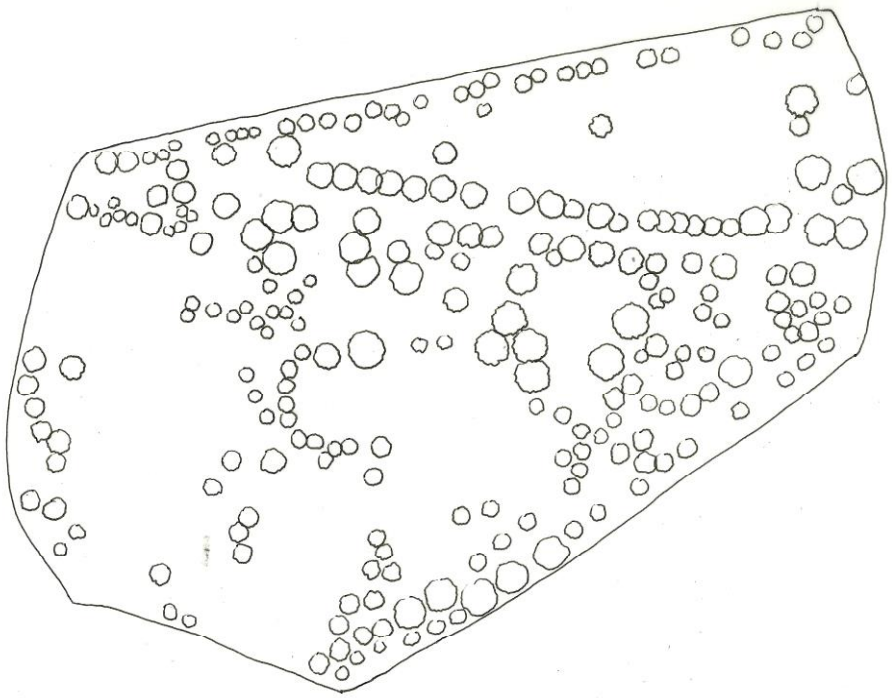
Photograph (author's own) of tree lined opening leading up to the Rand Regiments Memorial where a portion of the new ground level pathway is sited with reference to the historical layout of the Johannesburg Zoo grounds.

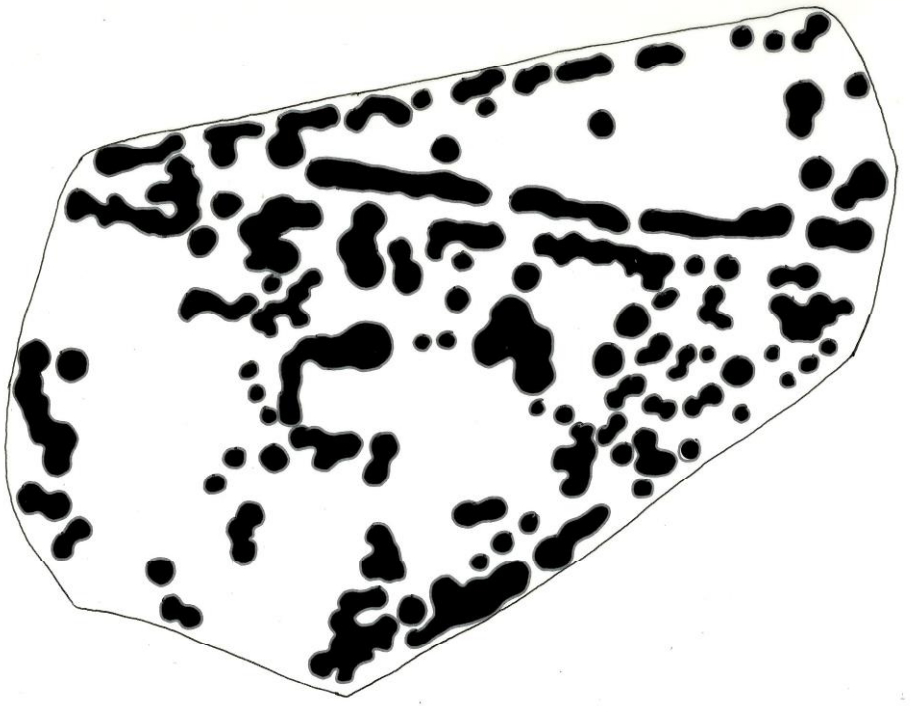


The site of the new intervention is divided into four key sections. These are two large mixed animal enclosures, a new lion enclosure and a new crocodile enclosure. The lion enclosure is located in the north-west corner of the site as a main attraction drawing visitors into the extents of the zoo whilst the mixed enclosures are divided centrally to maximise edge as observation opportunities. Water bodies are dispersed through the landscape, most of which are already existing – just made larger. Two wildlife bomas are positioned in close proximity to the northern service entrance to allow for isolation of specific animals from the mixed enclosures for capture/treatment.

RAISED WALKWAYS

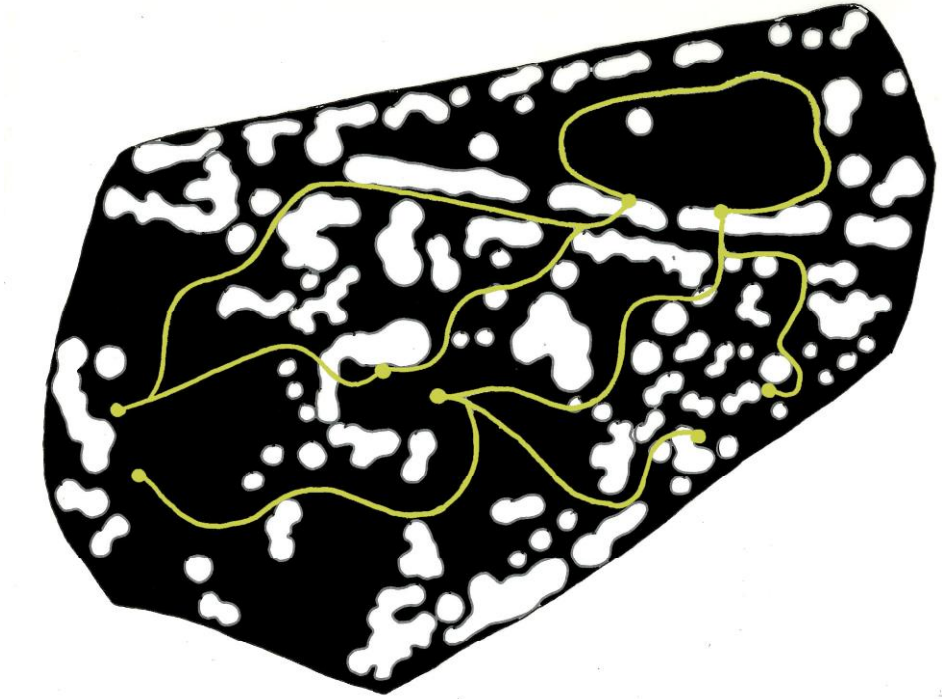
Process of Organic Layout

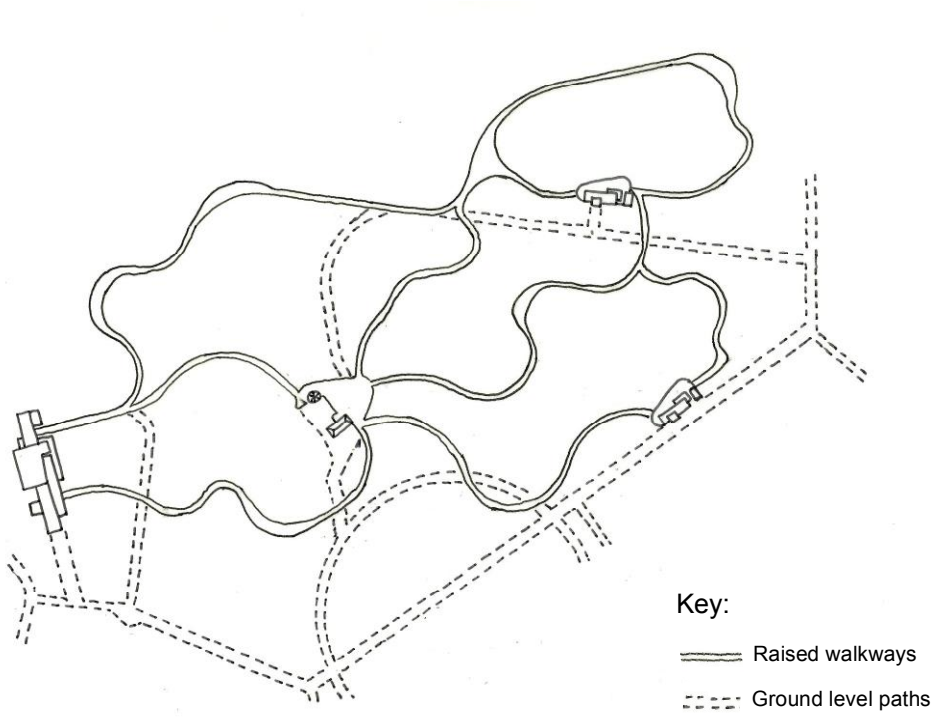




Trees play an important role in the history of Johannesburg Zoo with the grounds originally being the site of a plantation. At a raised level the existing trees become a key factor in determining the possible geometries for a raised walkway.

By considering the tree line as a solid object the open spaces between the trees where a raised walkway could be constructed become apparent. This ensures that any construction will also not inhibit the growth of existing trees by respecting their boundaries.





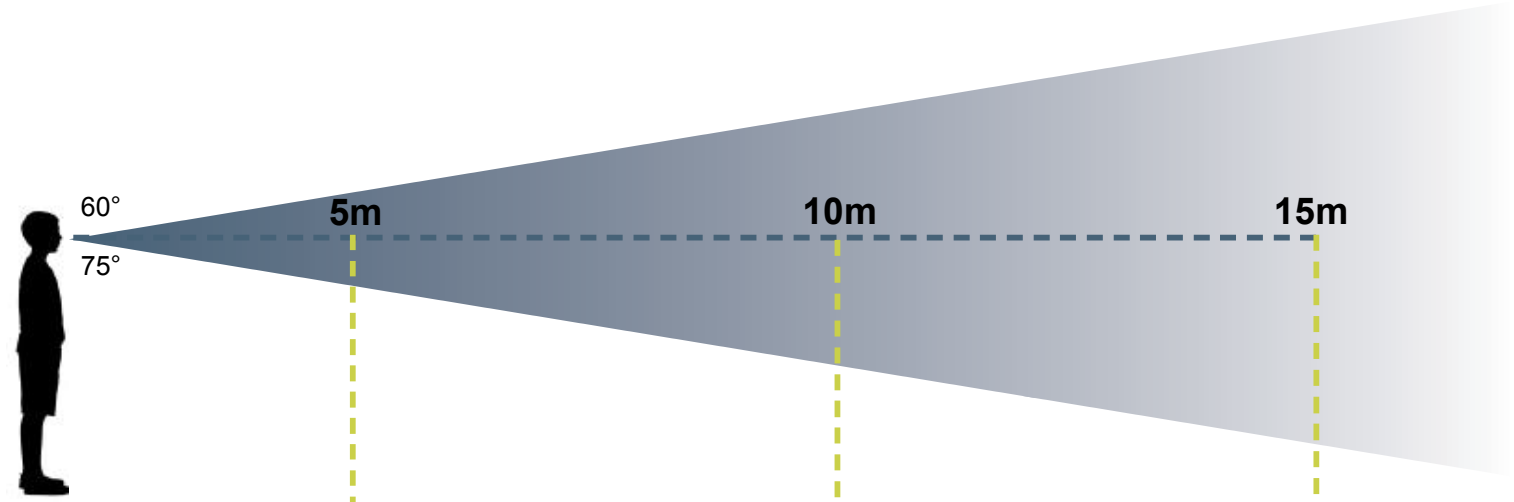
Looking at this negative space between the trees, a fluid pathway connecting the points of vertical circulation is derived. In places the network flows across open spaces whilst in other areas it is placed in close proximity to the tree line creating a variable viewing experience.

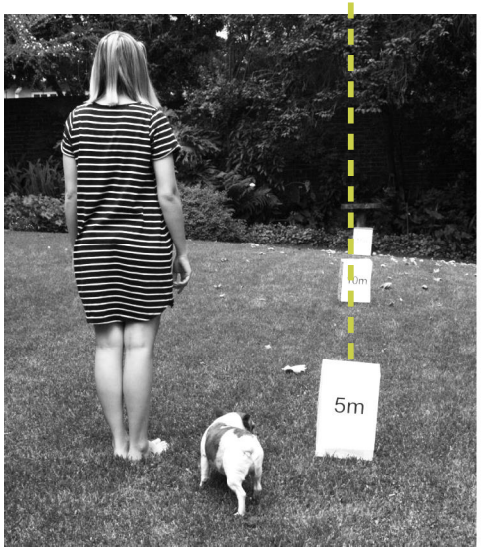
Together with the more rigid ground level pathways the raised walkways ensure visibility into all of the areas within the new large zoo enclosures. The geometry of the walkways ensures that all routes are able to be used as loops and one never has to double back on oneself.

SCOPE OF VISION

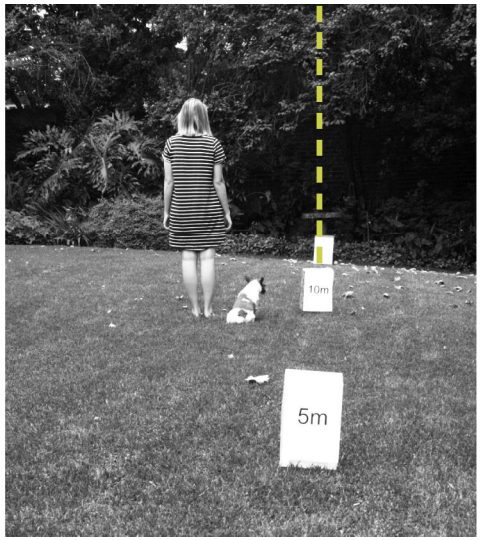
This photographic exercise illustrates the clarity of vision from different distances based on the average person's scope of vision.

Within the proposed large mixed enclosures the proximity of observation is determined by the animals because they have liberty of motion. By raising a fundamental section of the circulation network the scope of human vision is increased, as one can see further from a higher vantage point, whilst allowing fluidity of movement for the animals on ground level below.

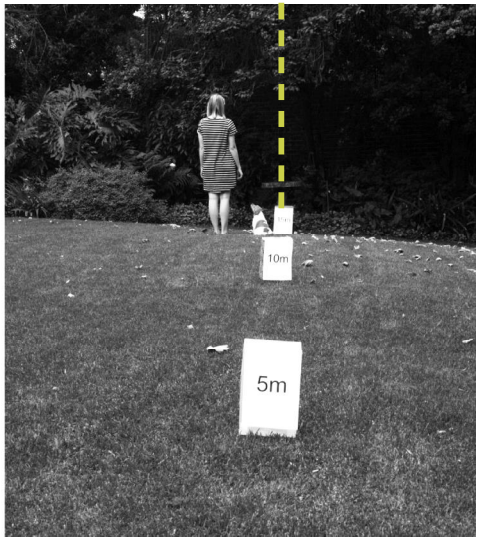




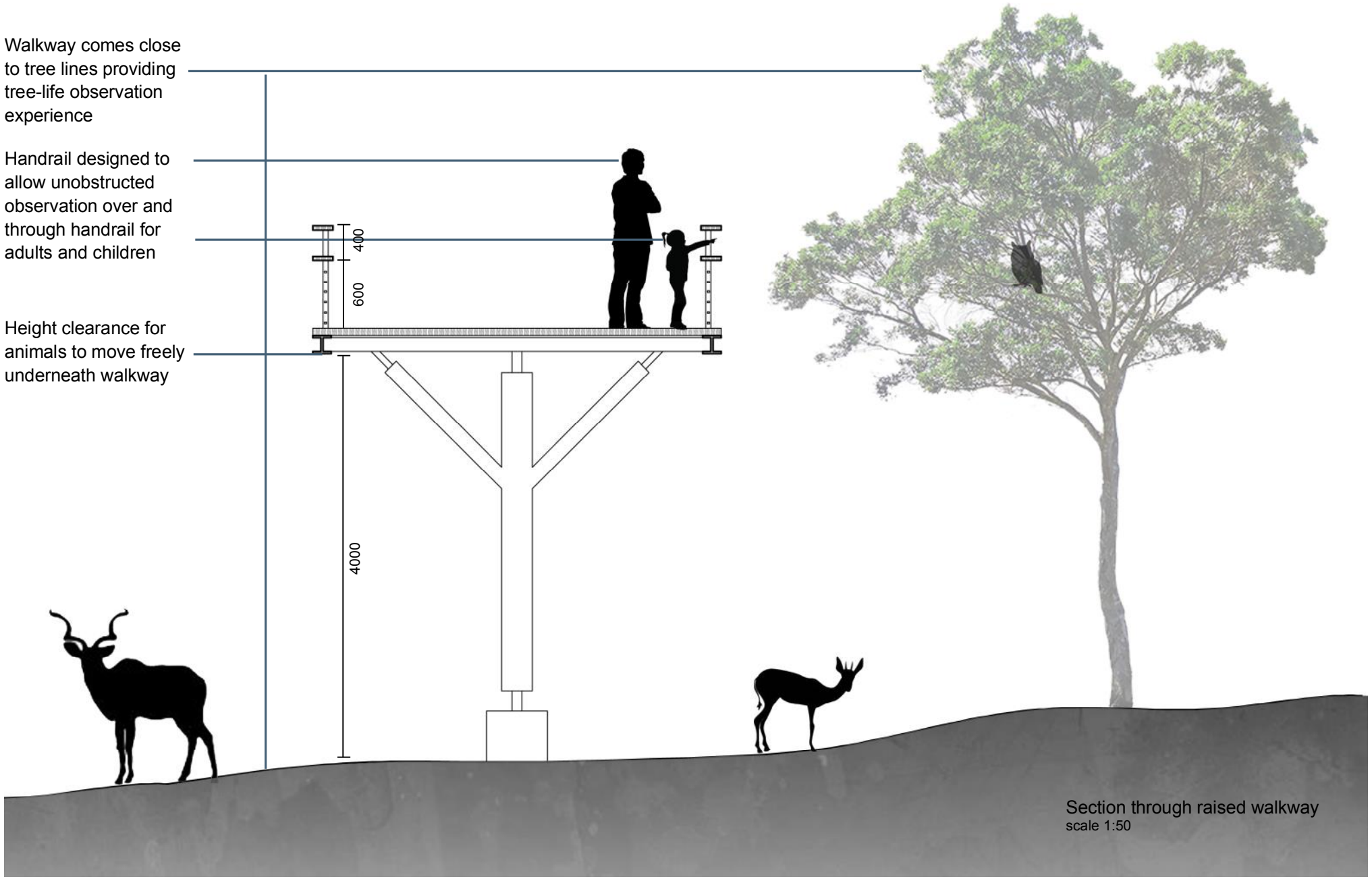
At 5m both person and animal are at an interactive proximity and can be viewed in great detail even from ground level.



At 10m the smaller animal is at a comfortable viewing distance in which detail can still be observed but does not pose a threat. The larger person can still be seen in clarity.



At 15m both person and animal are still clearly visible and easily identifiable but can be observed in less detail.



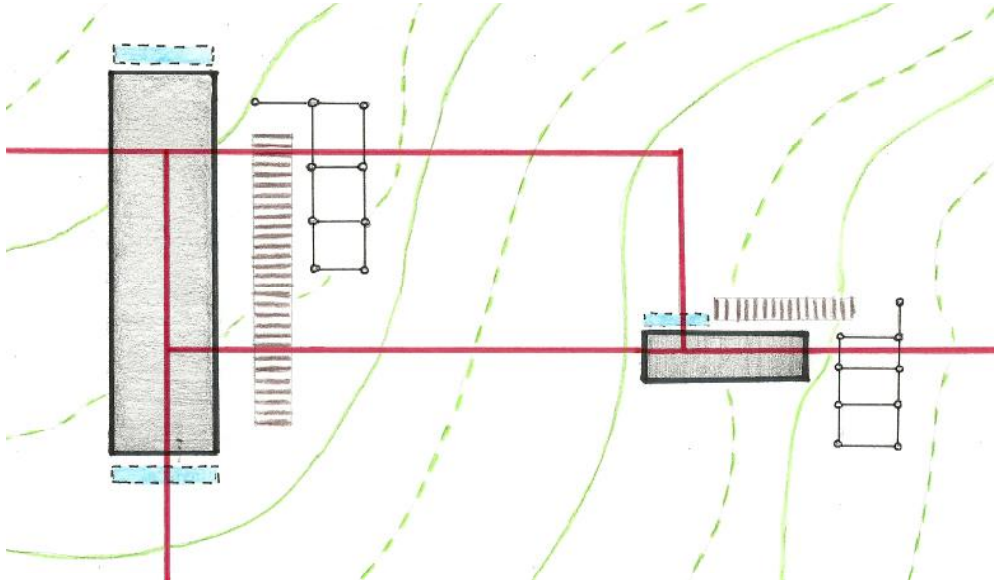
Section through raised walkway
scale 1:50

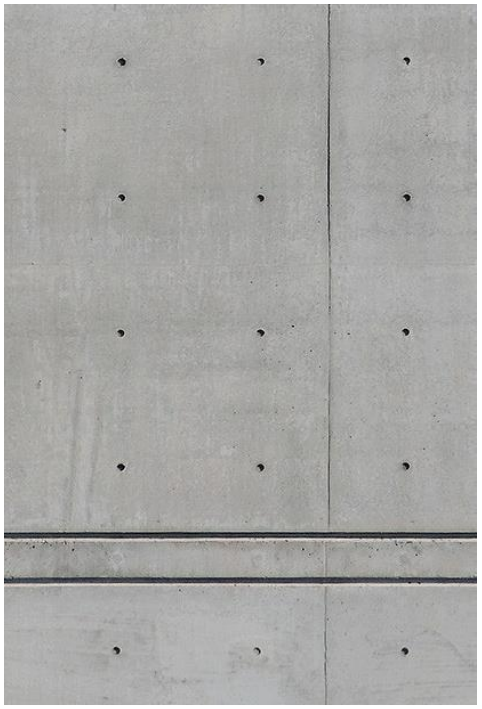
AESTHETIC CONCEPT

A Patchwork of Textures

Owing to the sporadic developmental nature of zoos it is near impossible to achieve a homogenous aesthetic style across the grounds. Taking into account progression in the fields of construction, conservation and technology, established zoos begin to resemble an architectural patchwork of their own narrative. The aesthetic concept behind this intervention for Johannesburg Zoo seeks to embrace this pieced-together aesthetic rather than creating an isolated ‘section’ to the zoo defined by its contemporary architectural style representative of the time.

A series of four textures, each with metaphorical significance are used as ingredients in the architectural language. Together the textures create a variable sensory experience of space connected by the raised walkways as both a physical and symbolic architectural tool.





Solid

The solid texture of a concrete structure serves as an element to weight the built form – indicative of the enclosed space as a space for human use within the organic landscape. The concrete elements define the overall geometry of the built form from which the lighter, more delicate textures can hinge.



Light

The texture of light is embodied through transparency within the built form. Glazed surfaces that capture views into the surrounding zoo grounds are intended to maintain a constant connection with the outdoors throughout one's experience of visiting the zoo – one never leaves the natural elements of the outdoors to enter an enclosed isolated space, a visual connection creates an experience of immersion within the natural landscape.



Cage

The textural quality of a timber slatted façade as well as the quality of light which it allows into the internal spaces is representative of the cage- less ambitions of the 'unzoo' concept. By using this texture as an enclosing element for spaces intended for people with a view out onto the liberated space for animals, the architecture becomes a reminder of the developments in animal captivity.

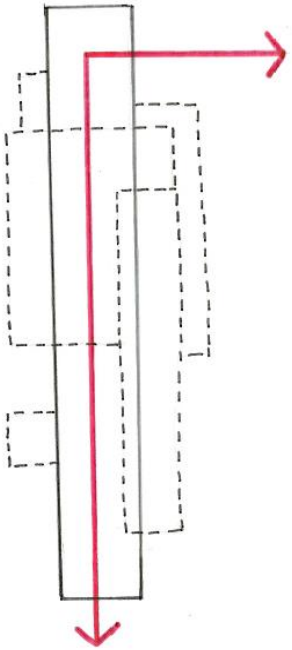


Frame

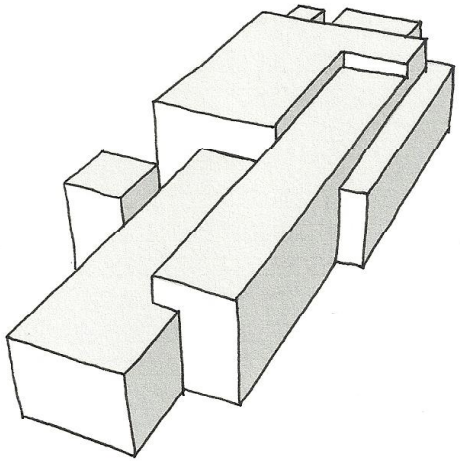
The texture of a frame structure is used as a mediating element between the solidity and transparency of the other architectural components. Blurring the boundary between inside and outside the steel frame structure elements introduce the language of the raised walkway and facilitate the junction between natural and man-made.

FORM FINDING

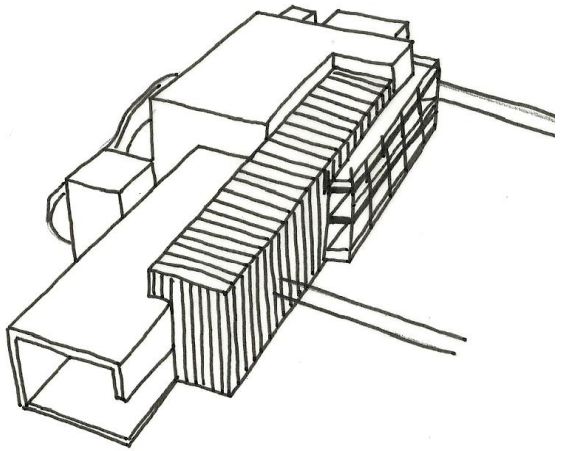
Interpretation Centre



Intersecting Planes



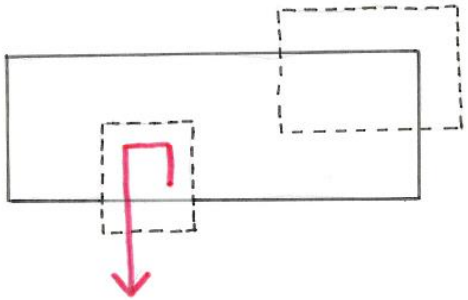
Extrusion



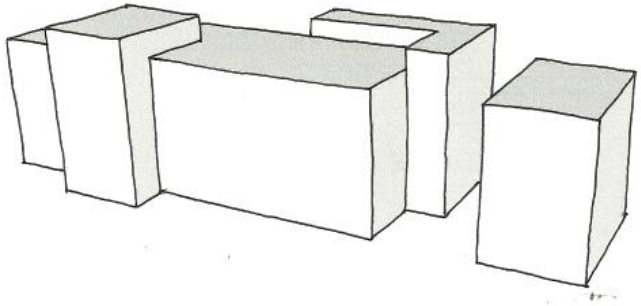
Application of Textures

The building form of the Interpretation centre is based on the concept of enclosing a ground level pathway (indicated in red). Through linking the idea of circulation with other programmatic functions it allows for the integration of educational features with the traditional zoo experience. The linear geometry of the pathway defines the core of the structure onto which a number of intersecting planes are hinged. Secondary functions branch off from the main linear form. Extrusion of these planes allows for sectional interaction between the different spaces and functions which are then enhanced through the application of different textures. Contrasting planes of solidity and transparency create a dynamic spatial experience of internal volumes from a relatively simple building footprint.

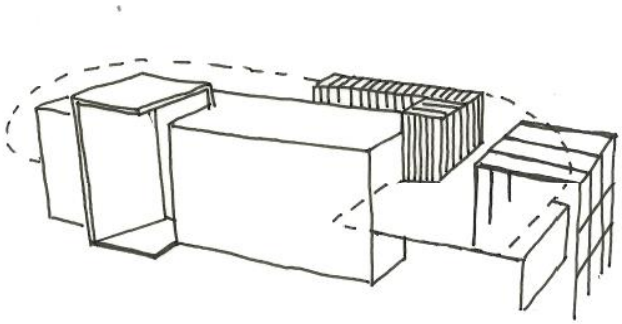
Refreshment Stations



Intersecting Planes



Extrusion

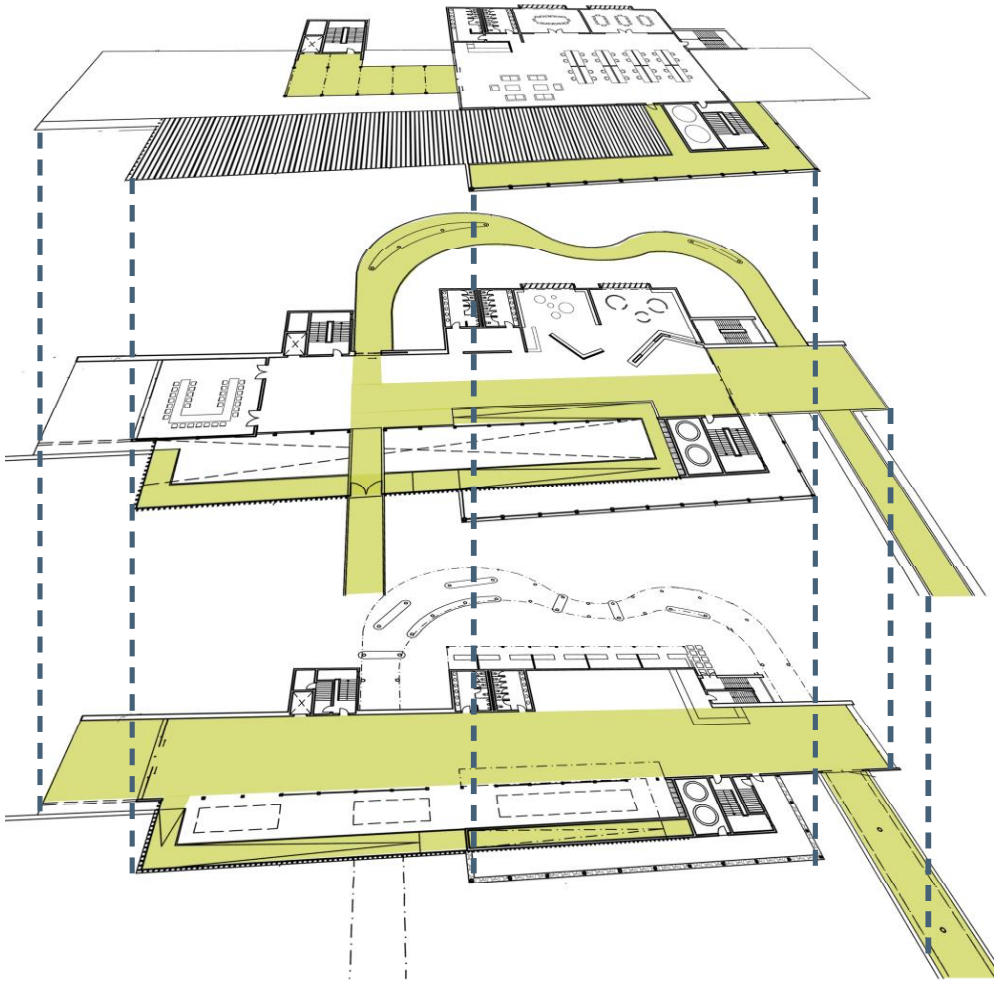


Application of Textures

The form of the refreshment station buildings is derived from the same process creating some continuity between the built form in the 'unzoo' development. Instead of the enclosure of a pathway these buildings serve a primary purpose of allowing vertical circulation between the raised walkways and ground floor movement network. Their form is as a result centred on this circulation. A similar conglomerate of functional spaces is hinged from these core spaces, as in the interpretation centre, just on a smaller scale. In both cases the architecture is orientated to optimise observation potential into the adjacent zoo enclosures.

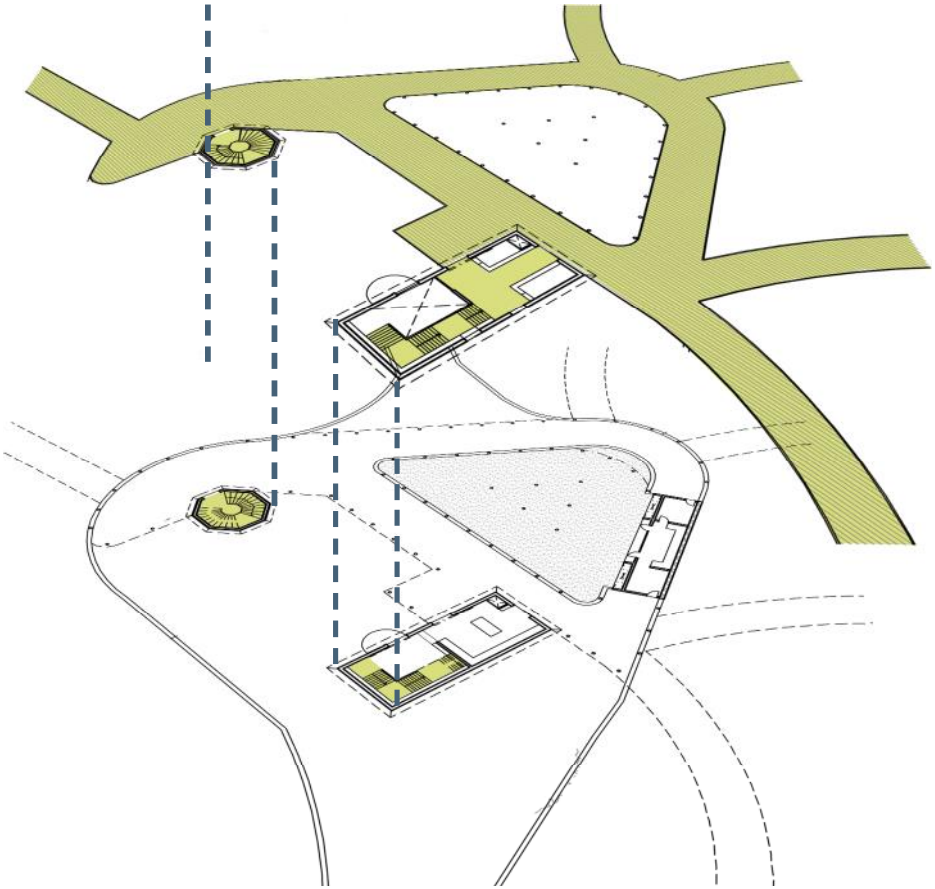
CIRCULATION AS EDUCATION

The primary attraction of visiting any zoo is obviously the viewing of animals – visiting other facilities such as education centres and informative displays becomes secondary in terms of visitor enthusiasm. A zoo layout which is successful in creating a conservational conscience needs to integrate the ideas of education and observation of animals, so that the zoo visitor gains not only a face value experience of the animals but rather gains a deeper understanding of ecology and the environment as a whole. This integration has been approached through the linkage of educational features with circulation space throughout the design. Spaces which visitors would want to move through to get from one viewing point to another become educational zones so that the idea of education does not have to be visited in isolation. This integration encourages a subtle learning experience to all who pass through the built form which contributes to the educational goals of the unzoo experience.



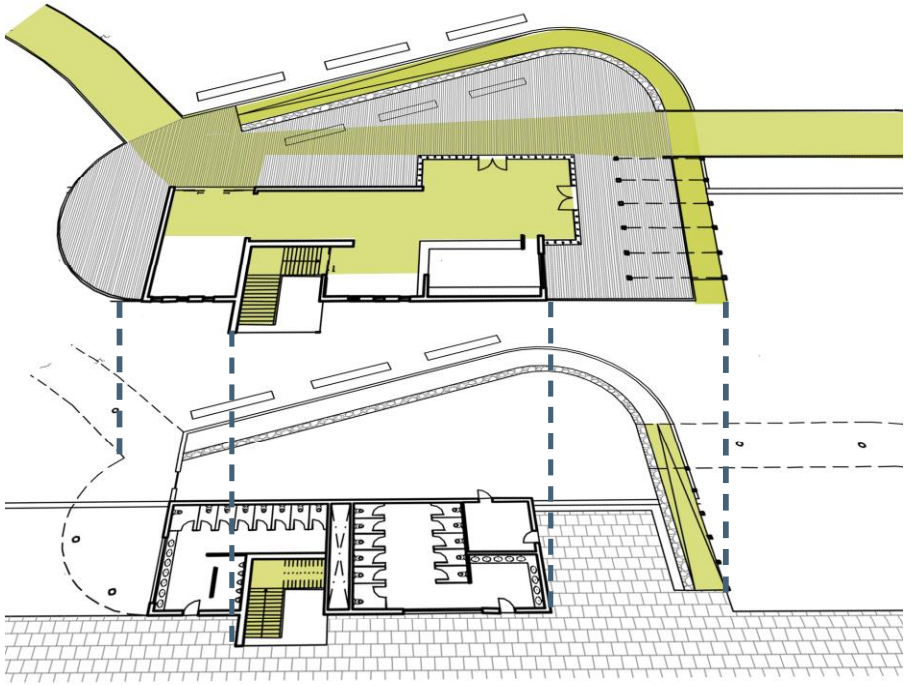
Interpretation Centre

In the Interpretation centre, in order to access the raised walkway into the zoo enclosures as well as the observation deck, one needs to walk up a ramp that circulates around the conservational gallery. This exposes visitors to conservational ideas upon entering and exiting the new enclosure space, promoting a holistic experience. Access to the office space on the second floor is also closely linked with views into the zoo and out over the zoo lake grounds as a visual reminder to the occupants of the cause they are serving.



Giraffe House Precinct

The stretched geometry of the giraffe houses is utilised as an opportunity for vertical circulation. All of the transitions between the raised walkways and ground floor pathways provide an opportunity for informative displays about the surrounding enclosures which does not have to be consciously visited but rather passed by.



Refreshment Stations

The refreshment stations are another important linkage between the upper and lower walkways connecting the two levels with a direct staircase or a curved ramp. The connection between all of these circulation routes provides another opportunity for educational displays.



Fig. 91

SUSTAINABLE FEATURES

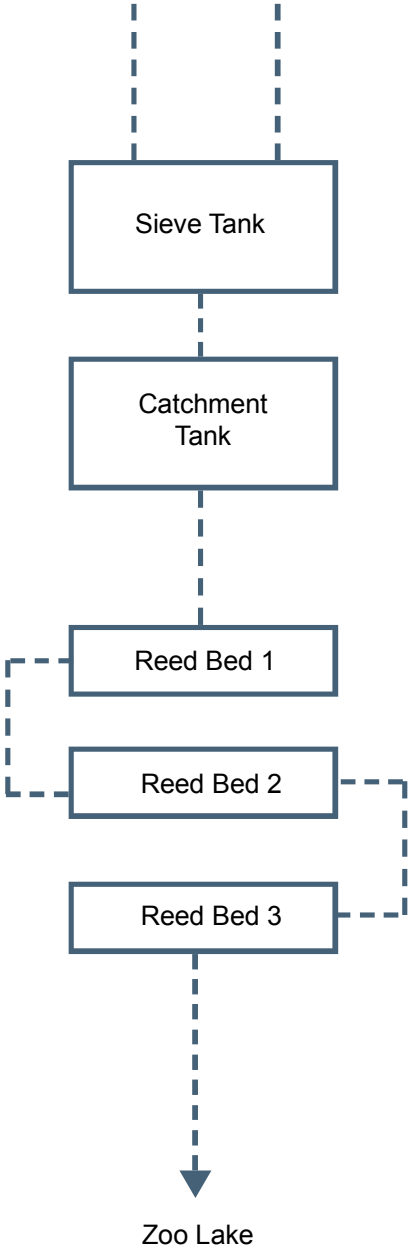
The Wetlands Project

Johannesburg Zoo makes numerous efforts to ensure the sustainability of its grounds and surrounding area. One of the fundamental projects in this regard is the wetlands project.

The Braamfontein Spruit, one of Johannesburg's major rivers, runs through the Johannesburg Zoo and down towards Zoo Lake. As a result of the spruit running close to a number of settlements throughout the city it is polluted with human waste and litter. The river enters the zoo grounds through two channels on the east and south sides of the zoo. Running through the zoo the water becomes even dirtier as it is contaminated with animal waste and discharges from the zoo enclosures. In 2002 the zoo implemented a water purification project to deal with the water pollution.



This wetland project not only has a substantial impact on the ecological sustainability of the surrounding area but also creates a platform for education. The designated wetland area falls within the selected site with one of the project aims being to exposure the sustainable process and create awareness about water pollution. The wetland becomes a fundamental factor in the placement of the new intervention to maximises educational potential of the successful initiative.



Process

The water from the two river inlets is channeled through a huge sieve tank in which litter and other solid objects are removed.

The water then flows into a large catchment tank from where it slowly settles into a settlement tank leaving pollutants suspended above.

The water which is now already much cleaner, is channelled into the first of three reed beds. These gravel ponds are planted with reeds and aquatic plants and are home to some indigenous fish. The zigzag layout of the plants maximises the surface area in contact with the flowing water which further removes impurities from the water. The first pond flows into the second and then the third, by the time the water reaches the final pond its faecal coliform count is zero and is considered clean.

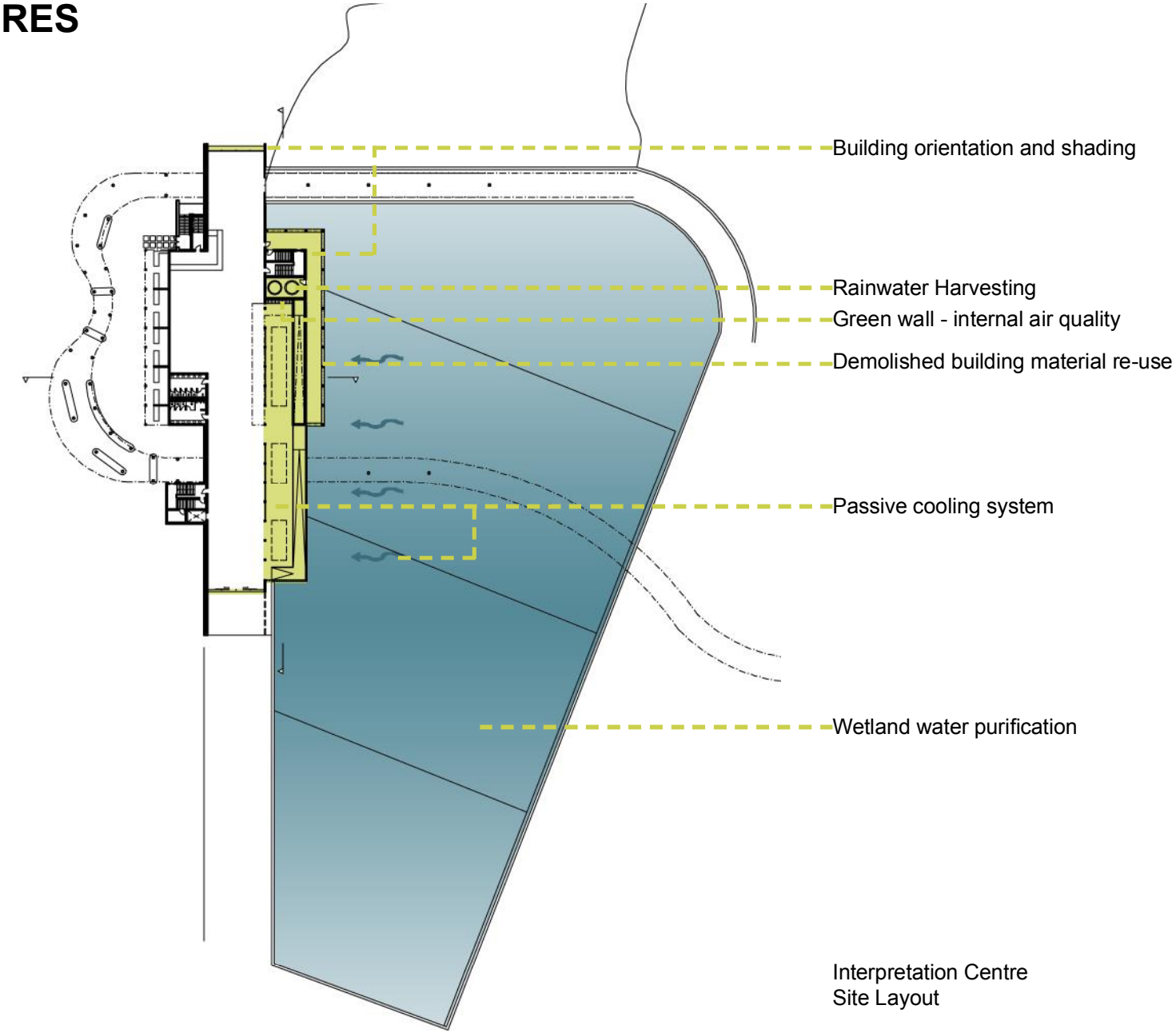
Some of the water is reused within the zoo with the remainder continuing on its natural flow into Zoo Lake to re-join the tributaries of the Braamfontein Spruit.

SUSTAINABLE FEATURES

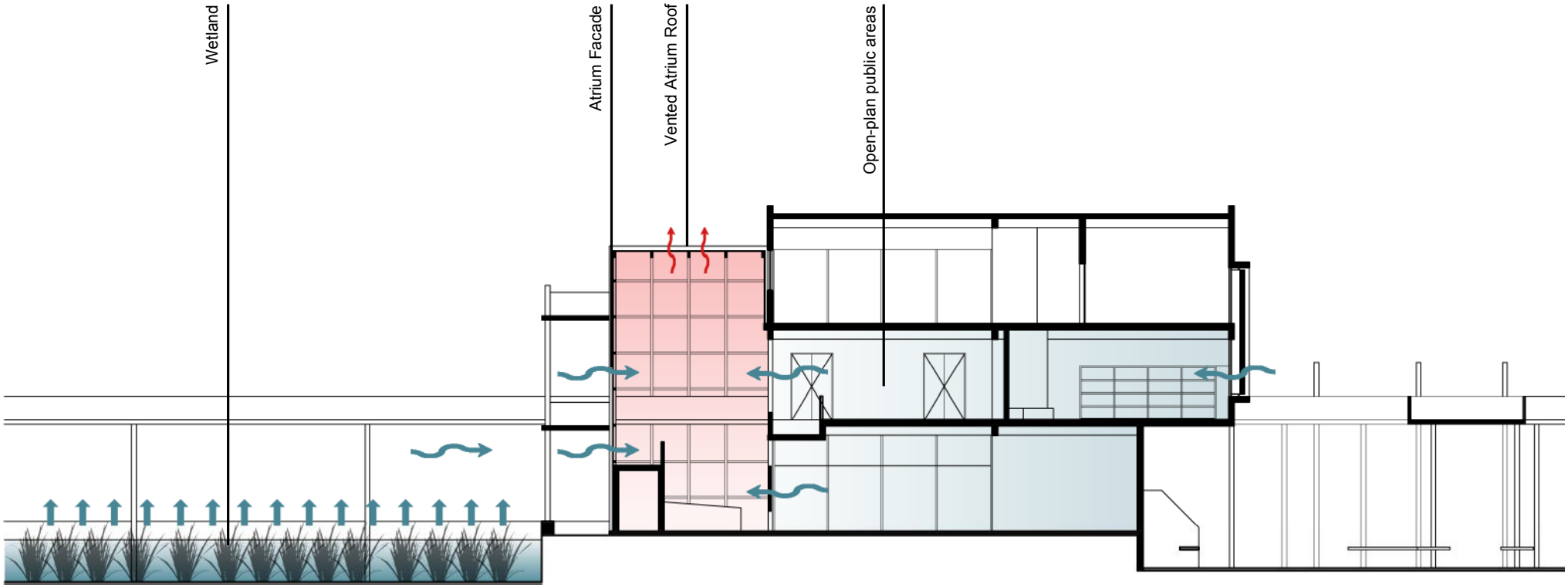
Overview of Intent

With conservation and ecological stability at the heart of this thesis it becomes important to ensure that all new developments are designed in a way that is conscious of sustainability. This intention is executed through a number of passive technologies that optimise natural features for temperature control, air quality, as well as material and water usage. This reduces the mechanical load of the building and serves as an educational tool.

As opposed to hiding these features as services within the built form, each of the elements is designed to be on display as an example of sustainable design methods to those passing through the buildings. Drawing awareness to projects such as the wetland purification system aids in achieving the aim of educating zoo visitors about the environment as a whole, as opposed to seeing animals in isolation.



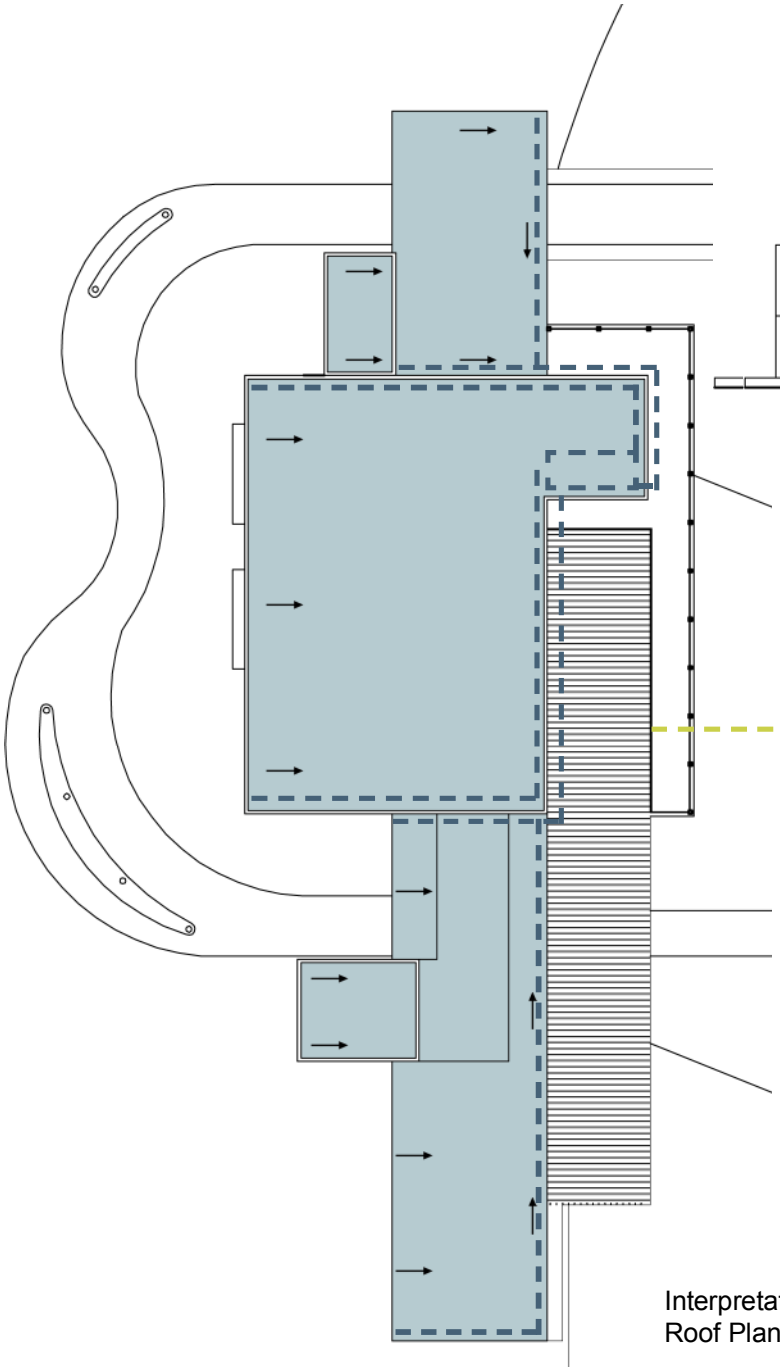
Interpretation Centre
Site Layout



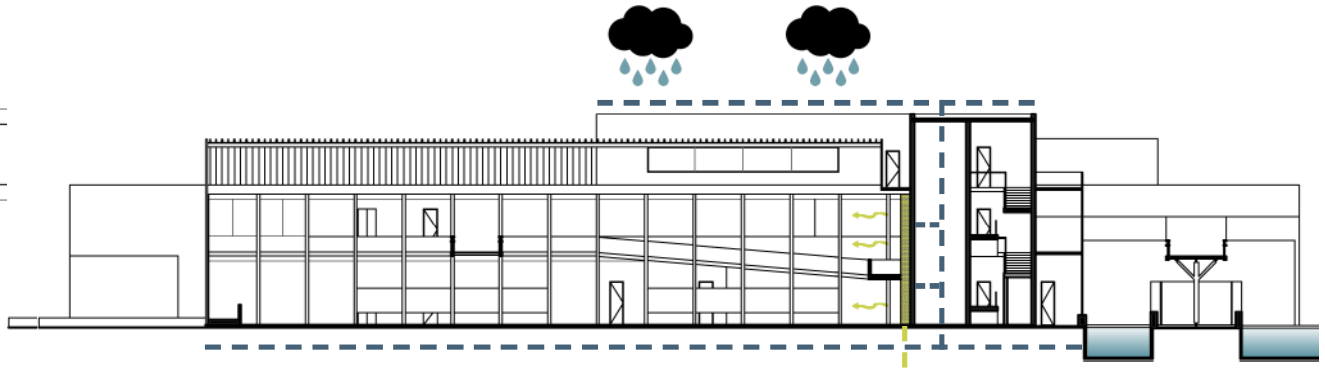
Interpretation Centre
Section C - C

Passive Cooling System

A passive cooling system is included to regulate the temperature within the open-plan publicly accessible spaces of the Interpretation centre. Through taking advantage of the evaporative cooling effect created by the water body of the wetland, cool air is drawn into the atrium space through vents in the façade. This air intake direction is also subject to the prevailing wind direction channelled down the valley type landform of the site. Vents in the atrium roof allow hot air to escape at the highest point of the public spaces, creating a pressure differential and drawing cool air through the building from below.



Interpretation Centre
Roof Plan



Interpretation Centre
Section A -A

Rainwater Harvesting

The roof surfaces of the Interpretation Centre provide an opportunity for the harvesting of rainwater. All rainwater from the indicated roof surfaces is channelled into the rainwater collection duct where it is stored in tanks. This water can be re-used as grey water in bathrooms within the building or fed into the wetland purification beds from where it will be reticulated into the zoo.

Green wall
- internal air quality

One of the internal walls enclosing the rainwater harvesting duct takes on the form of a vertical green wall. This planted surface is irrigated with the harvested rainwater. Internally this presence of vegetation creates an appealing focal point and reminder of natural elements at the turning point of the main circulation ramps. The plants also have a cooling effect and help to purify the air which improves the internal air quality of the major atrium and gallery spaces.

Horizontal louvres on northern facade



Fig 92.

Vertical louvres on western facade

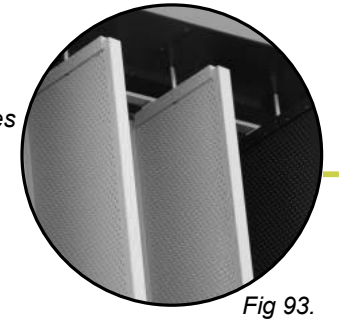


Fig 93.

Minimal glazing on western facade

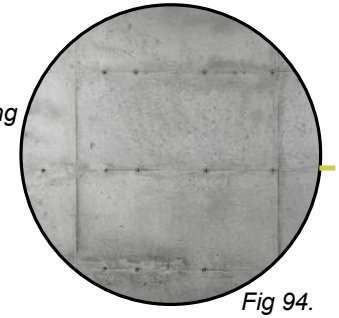
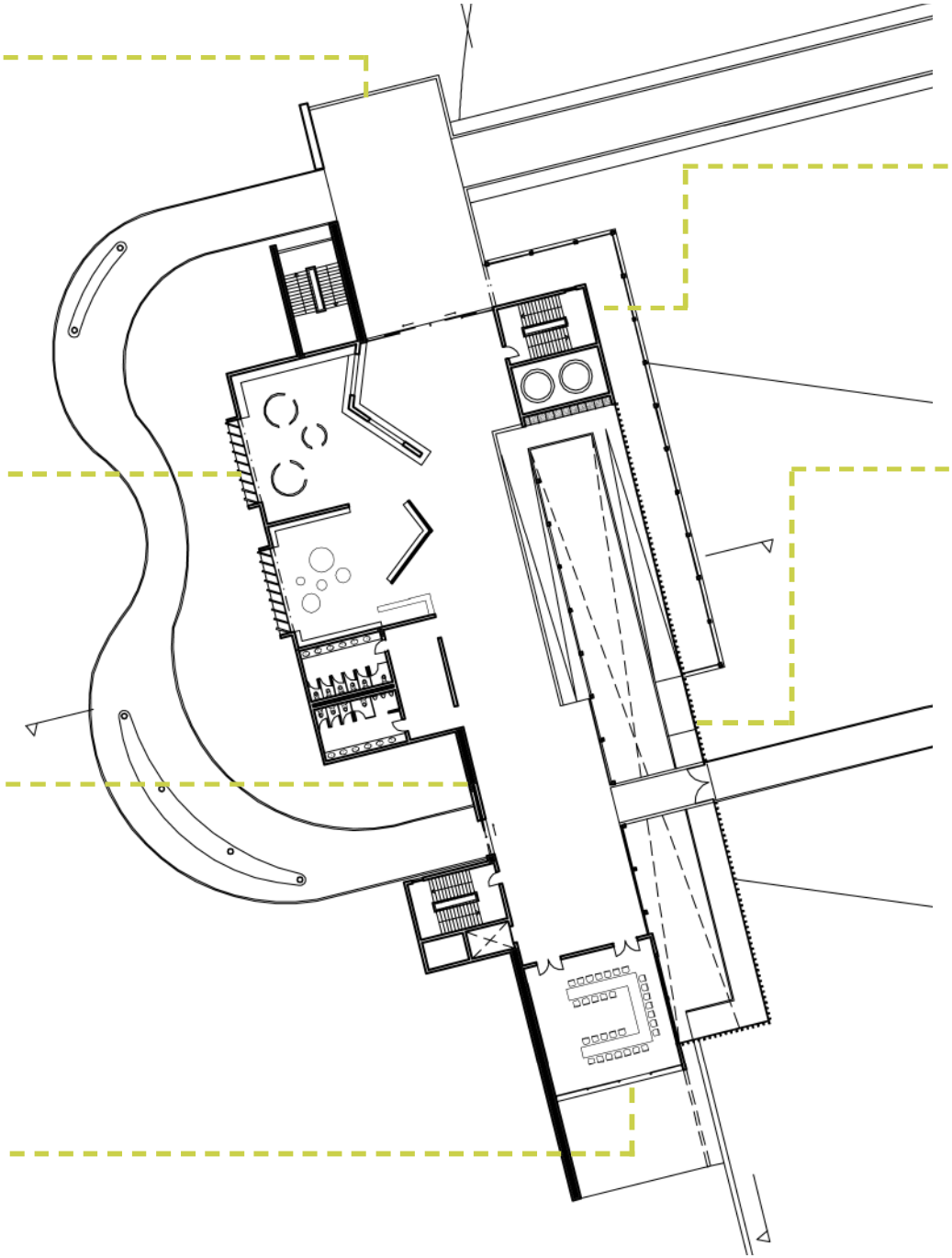


Fig 94.

Natural lighting from glazing on southern side



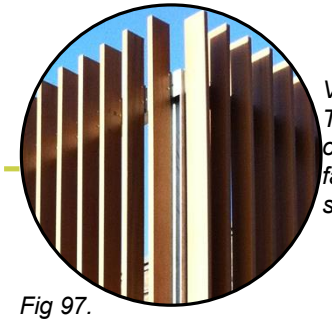
Fig 95.





Steel frame walkway as shading element

Fig 96.



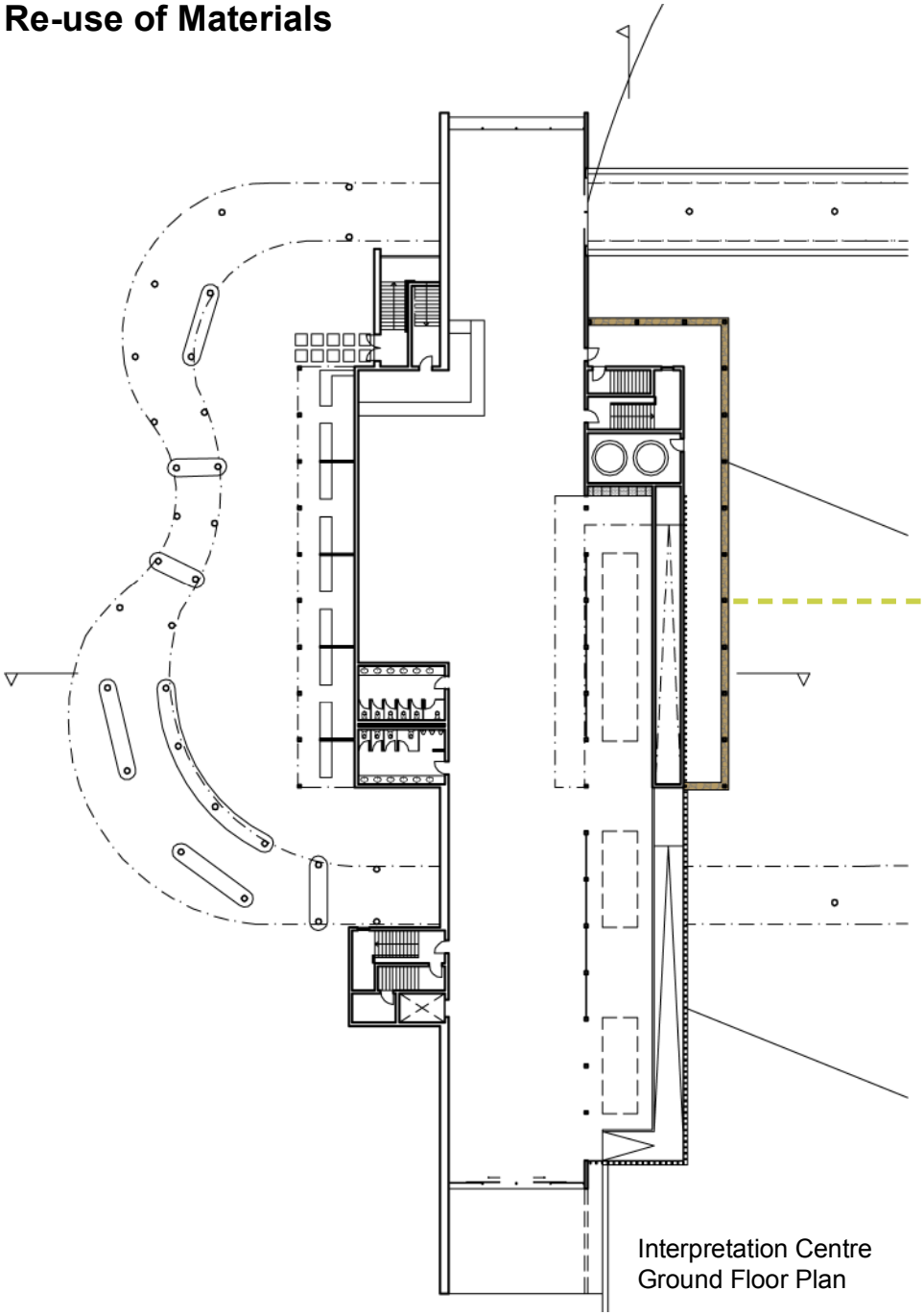
Vertical Timber slats on eastern facade glazing sections

Fig 97.

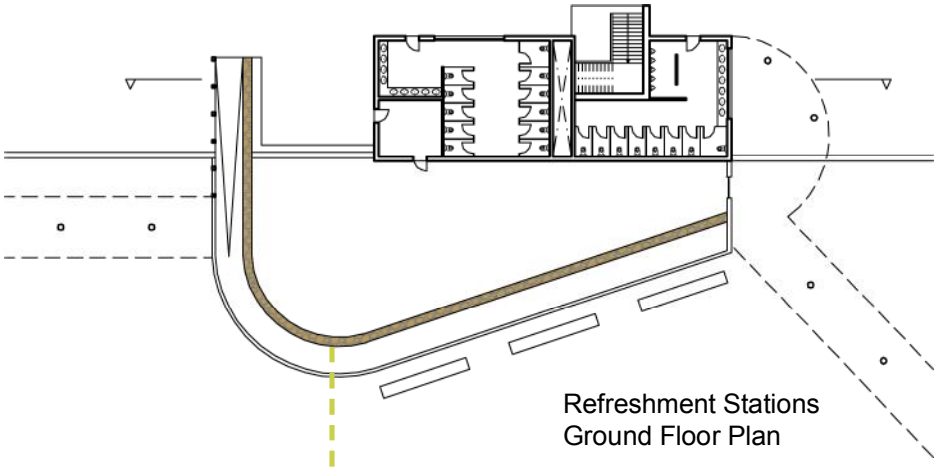
Orientation and Shading

Owing to the position of the existing wetland and the circulation logic of the zoo design, the Interpretation Centre has a predominant north-south linear orientation. Whilst this is uncommon in sustainable design for the southern hemisphere the internal spaces and their openings to the outside are designed carefully to control solar heat gain. Each façade surface is treated with appropriate shading mechanisms for the solar direction whilst ensuring natural light intake and cross-ventilation opportunities.

Re-use of Materials



Interpretation Centre
Ground Floor Plan



Refreshment Stations
Ground Floor Plan



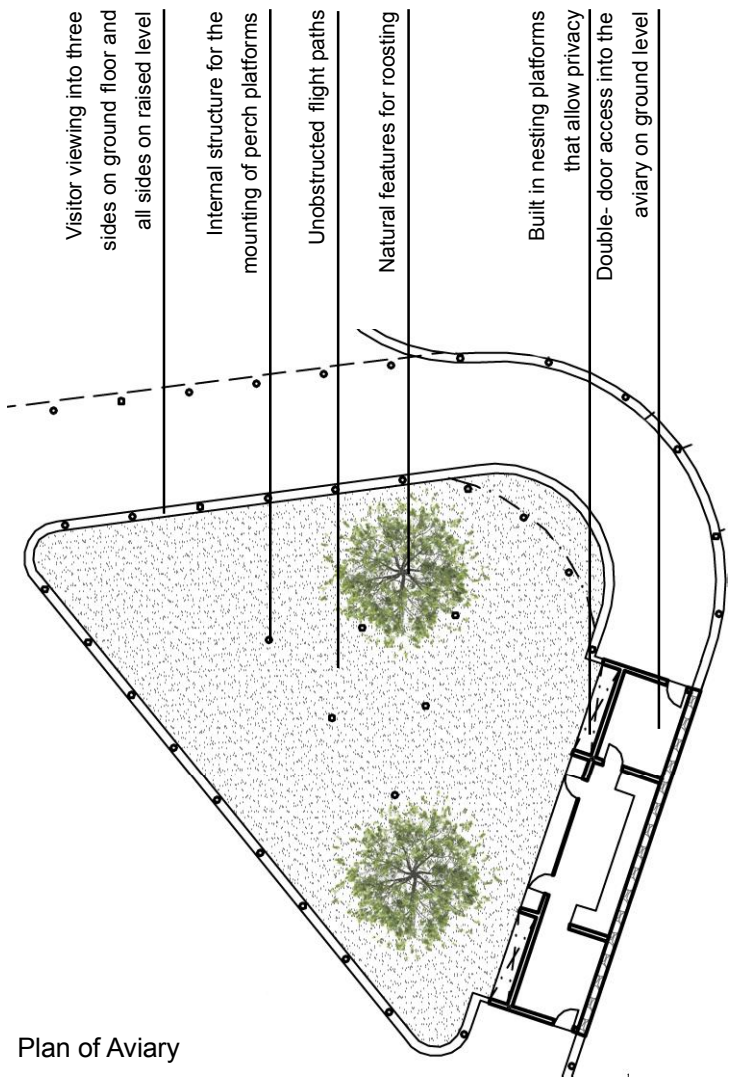
Gabion Walls as a textural design element

As a result of the re-development scheme requiring the demolition of some of the existing built form within the selected intervention site there is an opportunity for the re-use of selected building rubble. Feature walls in both the Interpretation Centre as well as the Refreshment stations are made from gabion cages filled with pieces of the demolished built form. This serves as a method of construction recycling as well as adding to the layered narrative of development which characterises the zoo typology. The walls are not structural, but surround lighter-weight steel structural elements to create a textural design feature.

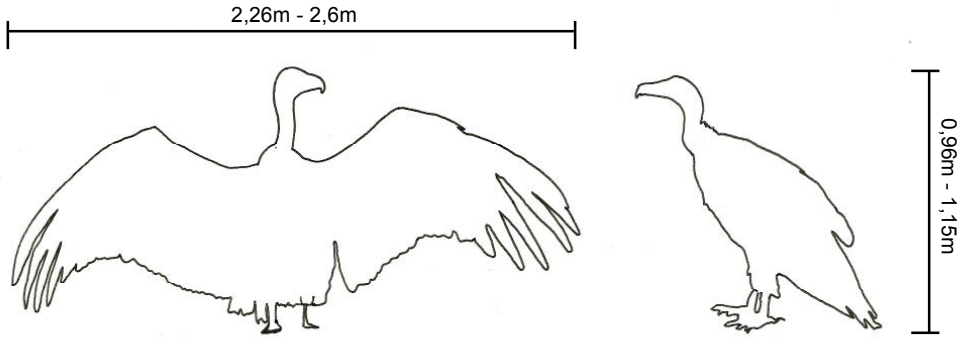
GIRAFFE HOUSE PRECINCT

Aviary Design

In Accordance with the recommended guidelines found in ‘Raptors in Captivity: Guidelines for Care and Management’ (Arent, 2007), the new mixed aviary facility located in the Giraffe House Precinct is designed with the following components and features.



Plan of Aviary



The largest bird that would be a part of the new aviary is a Cape Vulture and therefore the facility is designed to accommodate this species. Based on the recommended guidelines found in ‘Raptors in Captivity: Guidelines for Care and Management’ (Arent, 2007), the structure meets the minimum spatial requirements to house up to 18 of these birds, or proportional numbers of smaller species. A minimum enclosure dimension of 10m long x 5m wide x 7m high is required to house one bird with this wingspan with the addition of 17m^2 of floor area for each additional bird.





A visit to Mohololoholo Wildlife Rehabilitation Centre where I learned valuable information about the compatibility of raptors as well as the requirements of aviary design. Photographs: author’s own.

REUSE OF SMALL SCALE HERITAGE BUILDINGS



Fig 98.

PRECEDENT STUDY: The Sackler Building

The adaptive refurbishment and reuse of the Sackler building, Battersea, London, provides an informative precedent for the reuse of small scale masonry heritage buildings. The protection of the historic built environment has become much broader than the 19th century focus on the preservation of large scale monumental structures which often hold a cultural significance. The realm of heritage architecture is inclusive of more modest buildings that are in everyday use, buildings which make up the complex urban fabric of a city (Department of Arts, Culture and Gaeltracht, 2012).

The Sackler building, originally a linear single storey factory with an open floor plan, has been converted by architect Haworth Tompkins to accommodate studio space for the Royal College of Art painting school. A lightweight steel structure was inserted independently of the existing brickwork shell. This allows the building to maintain its historical tactile charm through its masonry elevations whilst providing a regulated system of internal spaces characterised by clean lines. The original pitched roof which was dilapidated was replaced with a contrasting modern 'sawtooth' profiled roof. This contemporary addition drastically increases the buildings' volume and provides natural daylighting into the studio spaces. The juxtaposition of the contemporary and historical architectural languages allow both generations of the building to remain true to themselves, enhancing their respective qualities of efficiency and charm.

A similar tactic of adaptive reuse can be applied to the small scale heritage buildings of Johannesburg Zoo. The giraffe houses, characterised by their disproportional height and warm masonry elevations provide a similar opportunity for the repurposing of internal volume whilst maintaining exterior tactile quality. Any expansion or addition to the limited functional space could be approached in a contemporary manner that both respect the existing without pretence of being new.

"The protection and forward management of the architectural heritage of an area should not be seen just as an end in itself. It should also be viewed as a foundation for giving a truly distinctive sense of place and identities to our cities" (Department of Arts, Culture and Gaeltracht, 2012). The repurposing of architectural function, such as in the Sackler building, allows spaces that were originally functionalist without significant spatial quality to acquire a new richness and identity through reuse.

Building details and images accessed from www.haworthtompkins.com/



Fig 99, Entrance showing original masonry and new roof structure junction



Fig 100, New lightweight steel roof structure allowing daylighting into studio spaces



Fig 101, Floor Plan, existing brickwork enclosure with new internal diviisions

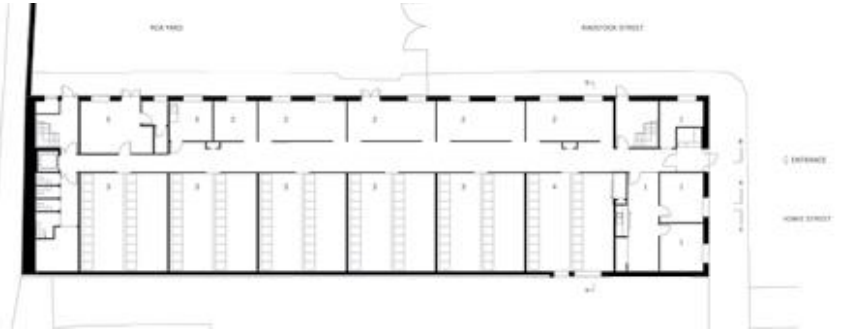
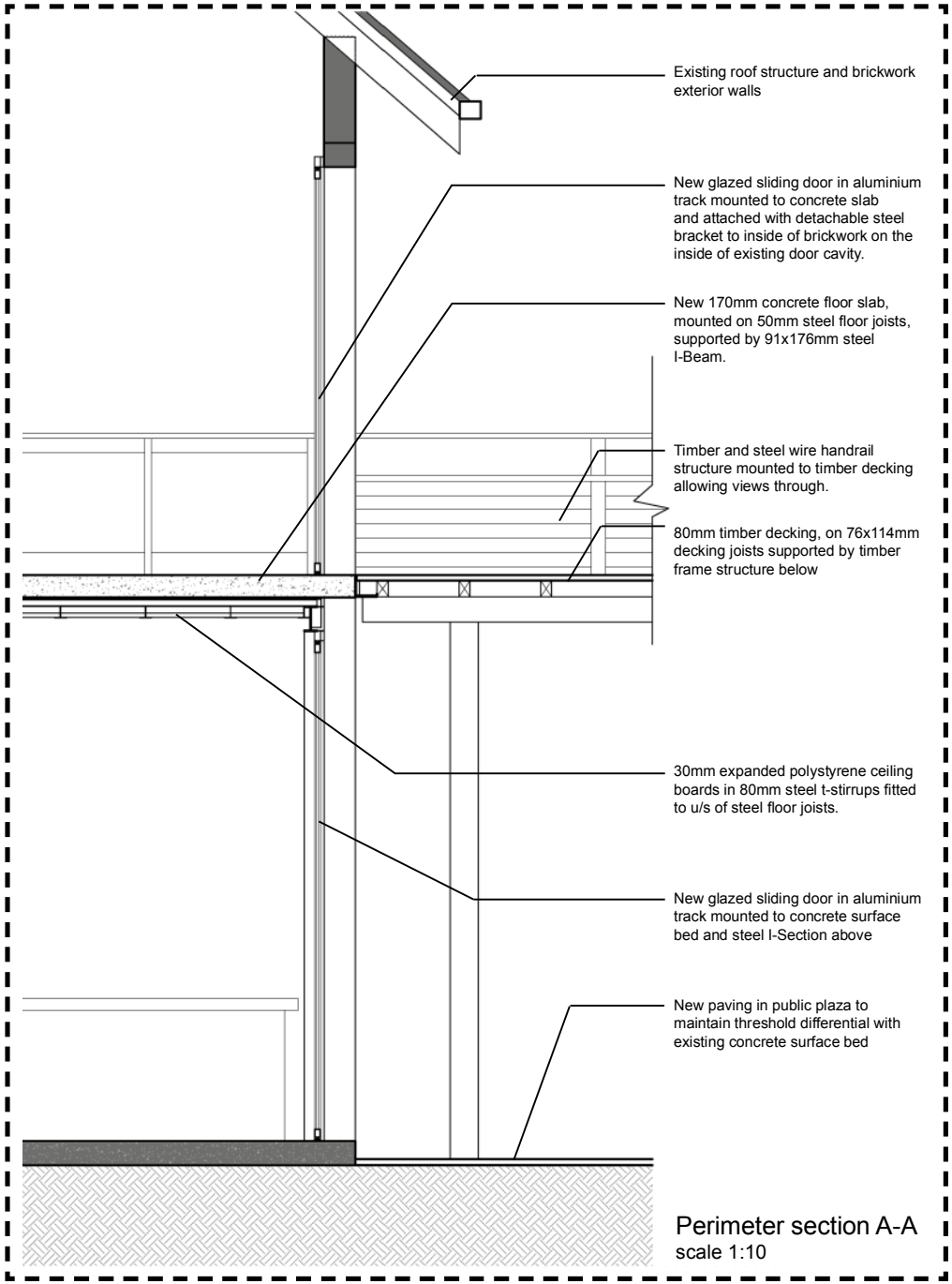


Fig 102, Contemporary internal studio spaces

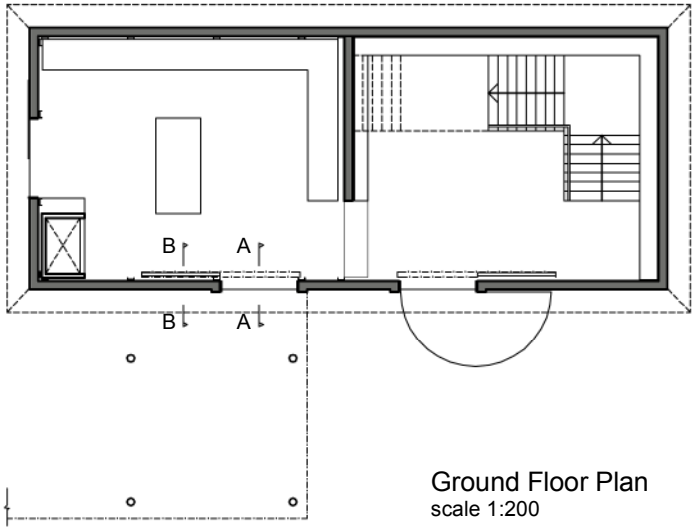
TECHNICAL ELEMENT

Giraffe House Renovation

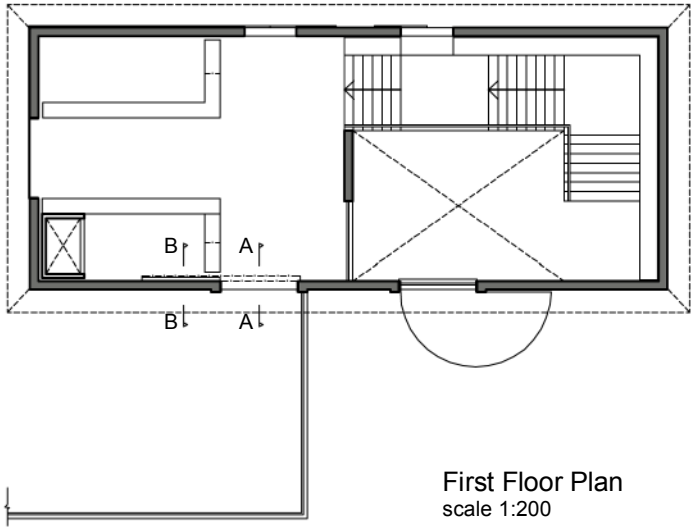
The giraffe houses, converted for human use, fall under heritage protection and therefore have to be treated in a respectful manner. This detailing of the double giraffe house illustrates the addition of an independent floor level within the structure. The insertion of a steel structural frame allows for the preservation of the original brickwork that remains visible both internally and externally. Preserving the character of the structure is important for the intention of its re-use. For this reason the new raised decking structure only intersects with half of the building leaving half of the characteristic front elevation unobstructed. The existing over-scaled timber doors, although not practical for use, are significant components in the structure's narrative. The insertion of independent glazed sliding doors and glazed windows on the internal façade of the structure allow the internal space to be weather-tight without jeopardising the external façade character.



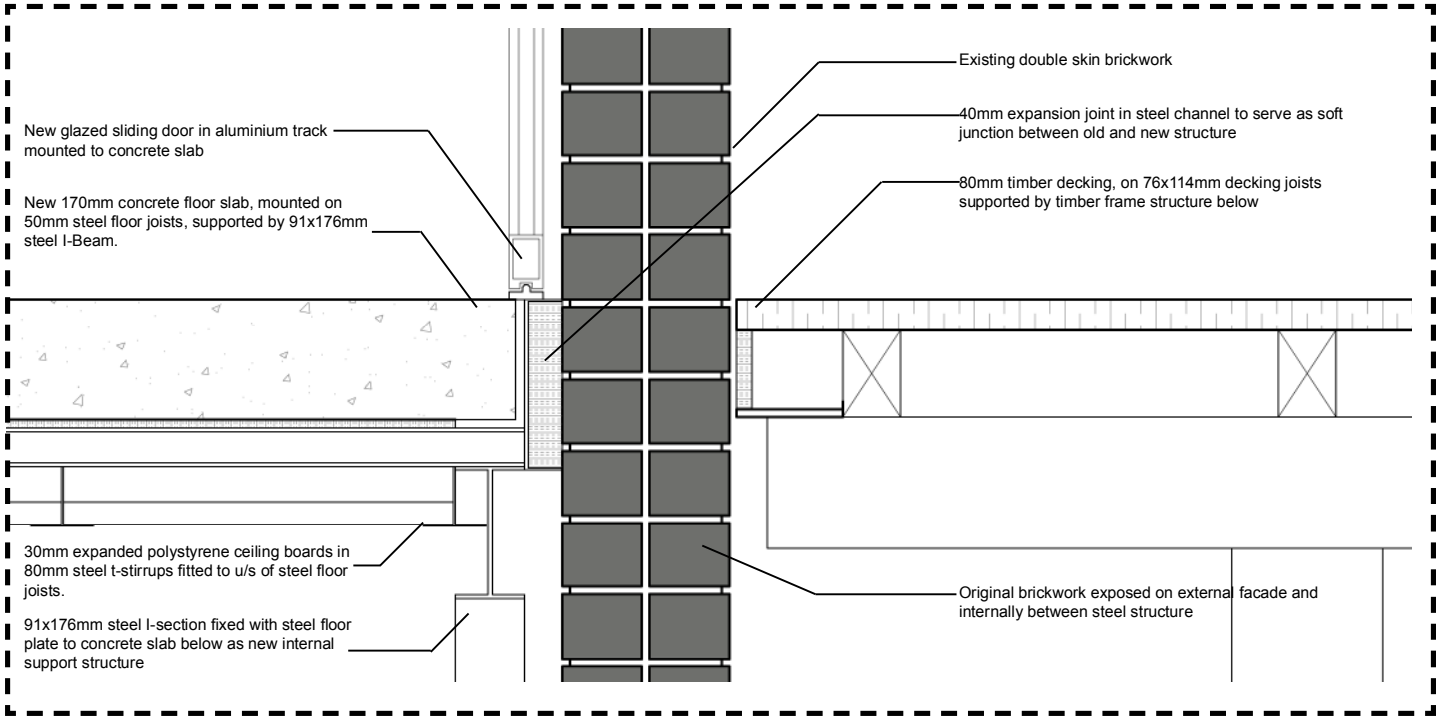
Perimeter section A-A
scale 1:10



Ground Floor Plan
scale 1:200



First Floor Plan
scale 1:200



Detail Section B-B
scale 1:200

PARKING AND ACCESSIBILITY

The Johannesburg Zoo, with its proximity to Zoo Lake has always been accessible from various points that have adapted over time to suit the demands of the urban setting. The zoo grounds are currently accessible through an entrance on Jan Smuts Avenue and an entrance on Upper Park Drive, these two entrances remain active in the new intervention with the intention of a third option being made available from the current Military Museum entrance gate - an administrative agreement between the zoo and military museum would make this option viable.

Public transport and ‘drop-off’ access is available at all three entrances with the most feasible in terms of accessibility being the Jan Smuts entrance as it is a main road. Public parking is then available at three points within the zoo lake grounds, the Jan Smuts Avenue entrance is easily and safely accessible from these parking facilities with a pedestrian road crossing at the zoo entrance. There are two further parking areas within the zoo grounds as indicated. The zoo parking garage (4) is currently under construction to expand the existing parking capacity.


KEY
1. Zoo Lake Parking
2. Bowling Club Parking
3. Zoo Lake Parking
4. Zoo parking garage
5. War Memorial Parking
Pedestrian friendly sidewalks
Public Entrances
Private/Maintenance Entrances
Context Plan
0 10 30 50 100m
N
Lower Park Drive
Kerry Road
Kilkenny Road
Tyrone Avenue
Dunoak Avenue
Jan Smuts Avenue
Lyttelton Road
Woodview Road
Upper Park Drive
Lyttelton Road
Ridge Road
Ettrick Road
Ettrick Road
Avonwold Road
Lyttelton Road
Sakonwold Drive
Ettrick Road
Ettrick Road
Beechwold Road
Waltham Road
Donaway Road

PROJECT VIABILITY

The proposed development is fairly complex and large in scope and scale and thus would require a substantial financial outlay. The applicability of this expenditure can be argued through the clear future benefits the development will have for the proposed client, Johannesburg City Parks and Zoo, both from a financial and organisational intent perspective. The development will contribute to a number of factors outlined in the mission statement of the Johannesburg Zoo, namely: Inspiring people to appreciate wildlife, integrating all aspects of operations with conservation efforts and responsible environmental management and creating a safe, accessible, family-oriented environment in which to explore nature in the heart of Johannesburg.

Income Potential

Although this project is a considerably large development which would require a large capital outlay the income potential of the development needs to be considered when discussing the feasibility thereof.

The successful construction of the project will have the following potential income opportunities to further increase the zoo's income in future years, all of which are possible income source from completion of the development.

- Increased zoo patronage and entrance ticket sales owing to additional marketing and presence in the area as well as improved public interface which will create interest.
- Restaurant/retail opportunity which will feed directly back into the zoo funding.
- Rentable office space for eco-tourism based companies which will help to cover the running costs and maintenance of the building.

Grant Potential

Owing to the nature of the proposed intervention being geared in entirety towards wildlife conservation and education there is potential applicability of a number of external funding grants/contributions. There are numerous international animal welfare organisations that constantly raise funds for projects around the globe focused on animal welfare and conservation. A large proportion of this funding is allocated to the rescue and rehabilitation of animals in their natural habitats which may have come under threat but it is not unprecedented for funding to be allocated to educational development projects in line with the greater promotion of conservation. Examples of such organisations would be The International Fund for Animal Welfare (IFAW) and The World Wildlife Fund (WWF) - an international entity which has been operating in South Africa since 1968. As a precedent the WWF recently funded the construction of The Living Planet Centre coupled with their UK Headquarters as an educational facility (www.wwf.org.uk/about_wwf/thelivingplanetcentre). This facility is very similar to the proposed interpretation centre in this thesis in intent and scale and therefore highlights the opportunity for obtaining similar funding.









Sponsorship

It is common practice within many animal welfare based institutions to seek sponsorship on an individual animal/species level. Examples of such sponsorship that already exist within the Johannesburg Zoo are through big corporations such as Anglo Gold Ashanti and Hollard. These companies, among others, have put forward funding for the initial development of specific enclosures as well as the provision of maintenance funding for the animals that occupy them. In return the enclosures are named after/by the sponsor and some form of branding appears alongside the visitor information about the exhibit as identification. My proposed intervention, although less numerous in individual enclosures, still maintains scope for this kind of sponsorship and advertising. Segments of the new development, for example each of the lookout decks, have the potential for corporate sponsorship which could greatly reduce the capital outlay for the project as well as the maintenance thereof. As the Johannesburg Zoo is a non-profit organisation any contributions made thereto are reflected in a charitable manner and would help to boost the sponsor company's civic profile.

Maintenance

The proposal of the new section of the zoo is characterised by its larger enclosures in favour of the existing small species specific compartments. This brings about a shift in maintenance methodology. The upkeep of this portion of the zoo would become less intensive in the way of cleaning out small enclosures, each with their own water and feed sources, and focus more of the monitoring of how the animals are sustaining themselves within the larger naturalistic mixed enclosures. Ensuring that feeding hierarchies and social interactions amongst species are in balance will become more prevalent in the new intervention. As a result the required maintenance workforce has the potential to be reduced as well as the new roles in this department becoming educational for the staff.

Phase Construction

The desired effect of the overall intervention would only be effectively achieved if the design is implemented in entirety. However, there is scope for the development to occur in phases. The interpretation centre could be built as the initial project catalyst with the walkways and new enclosure structuring to follow systematically afterwards. This could potentially increase the project's feasibility by staggering the capital outlay.

The benefits of conservational exposure and education cannot be quantified because the survival of many species is dependant thereon. It is for this reason that a radical scheme such as this proposal could be ultimately justified.



08 Final Design


KEY
Historical Buidings
New Intervention
Context Plan
0 10 30 50 100m
N
Lower Park Drive
Jan Smuts Avenue
Ensworld Way
Waltham Road
Upper Park Drive
Woodview Road
Dundalk Avenue
Kilkenny Road
Keep Road

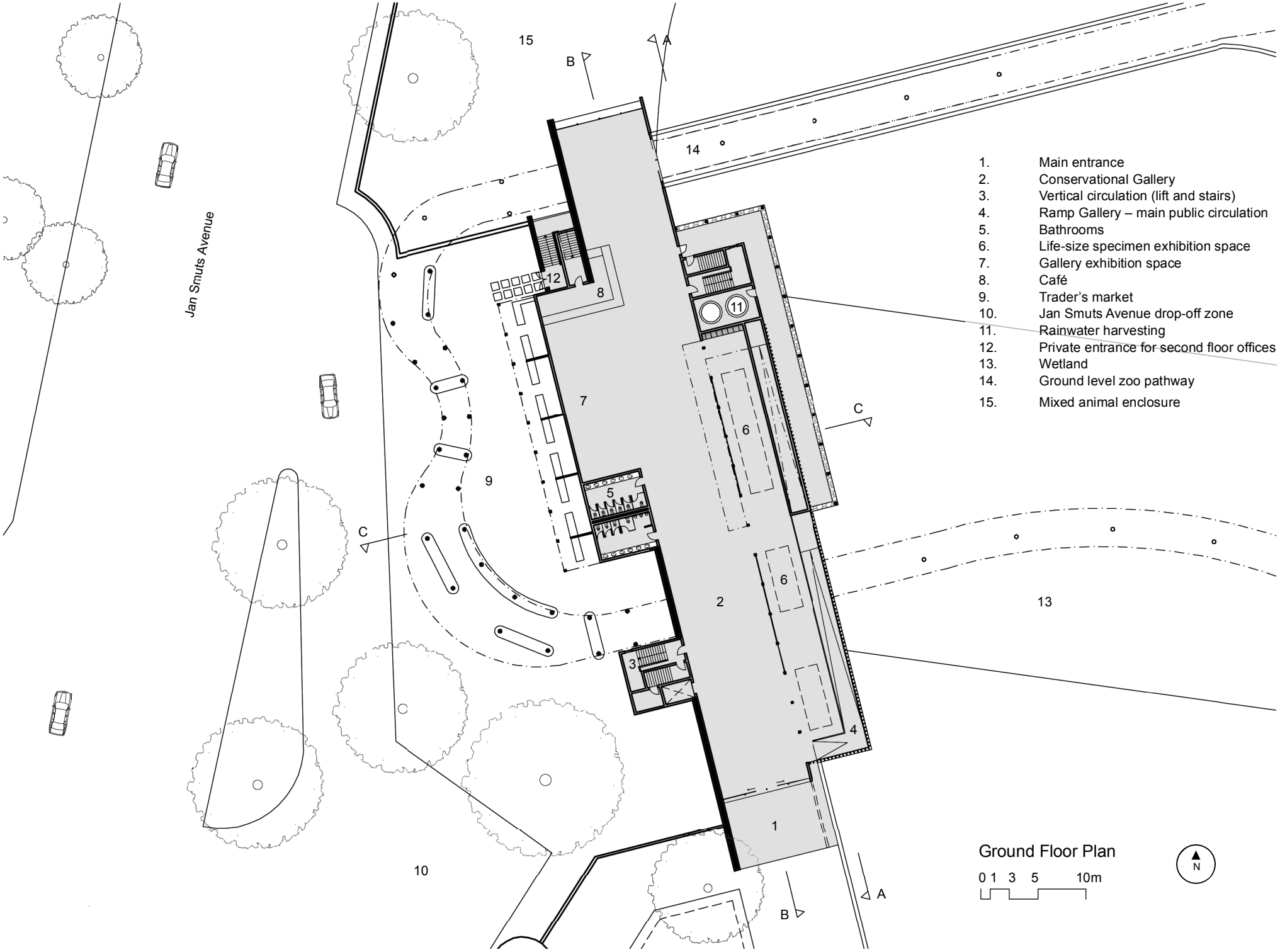

Erlswold Way
Jan Smuts Avenue
Site Plan (ground level)
0 10 30 50 100m
N

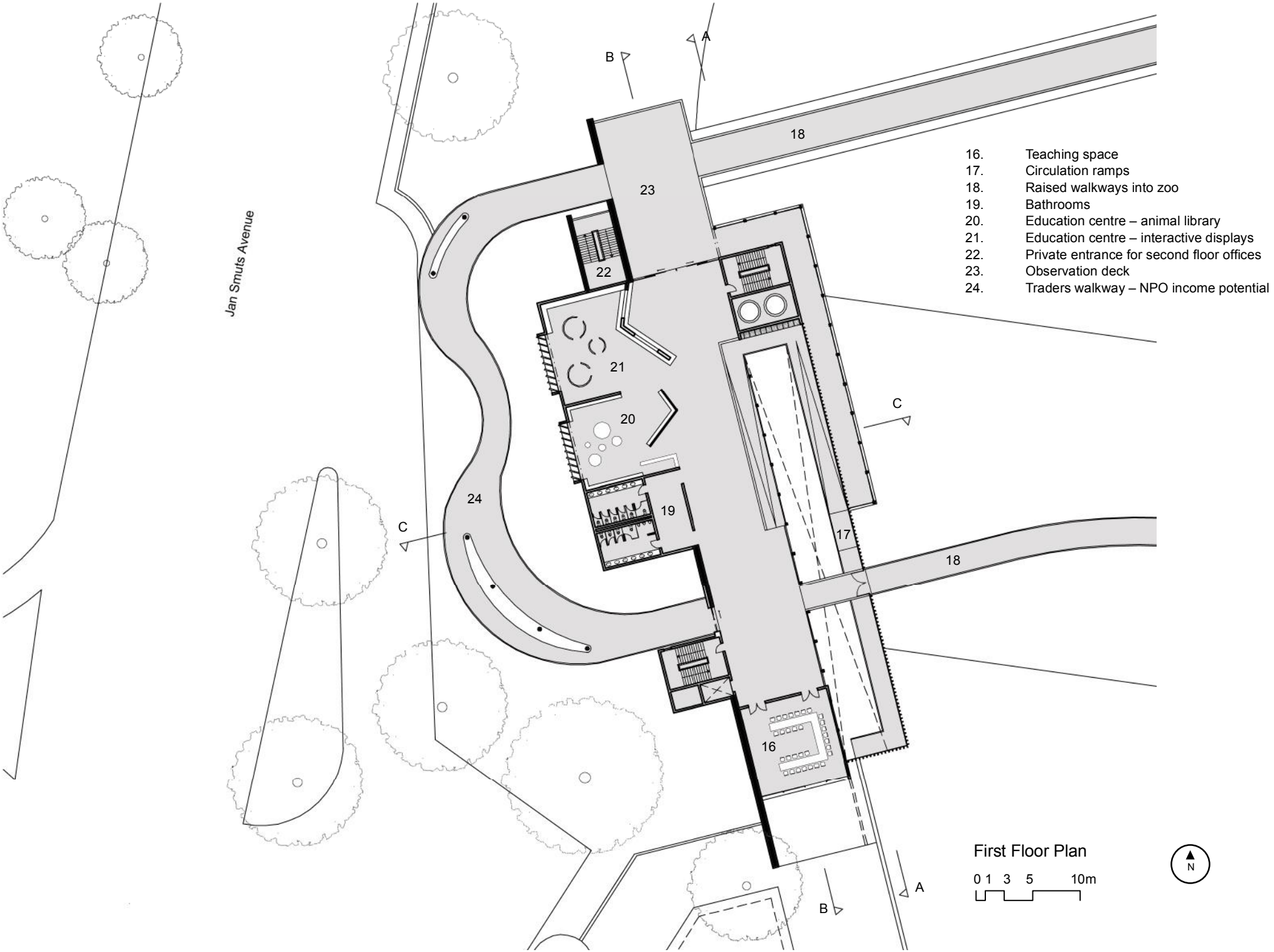

Erlswold Way
Jan Smuts Avenue
Site Plan (raised level)
0 10 30 50 100m
N

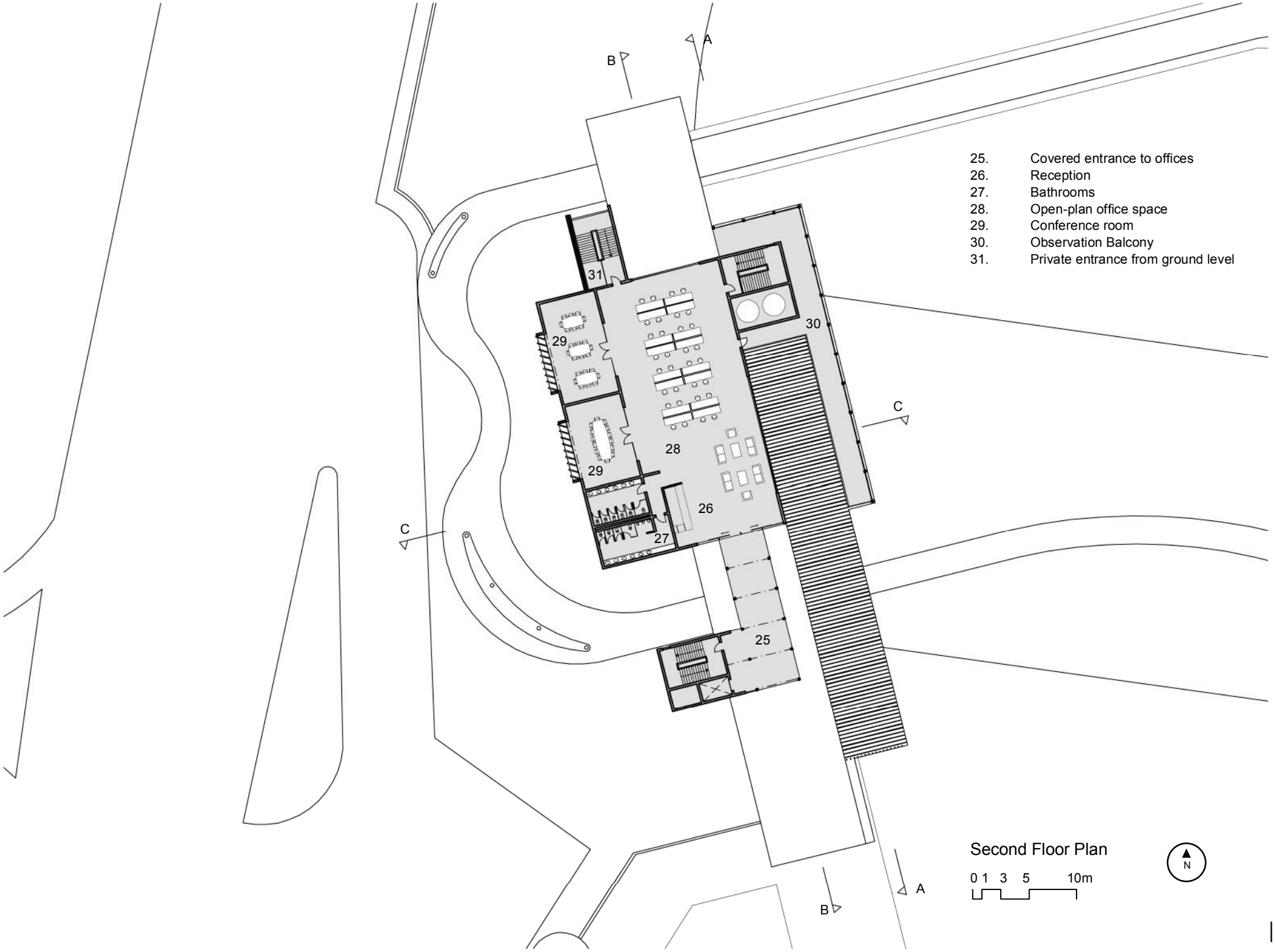
INTERPRETATION CENTRE

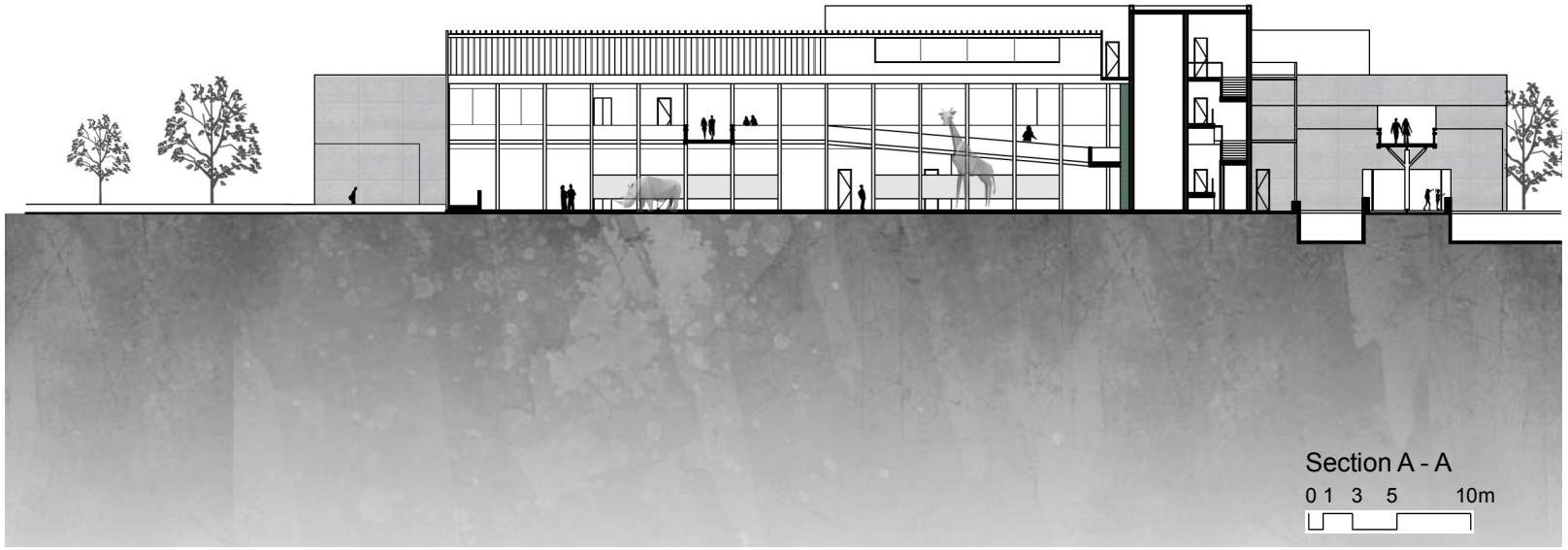


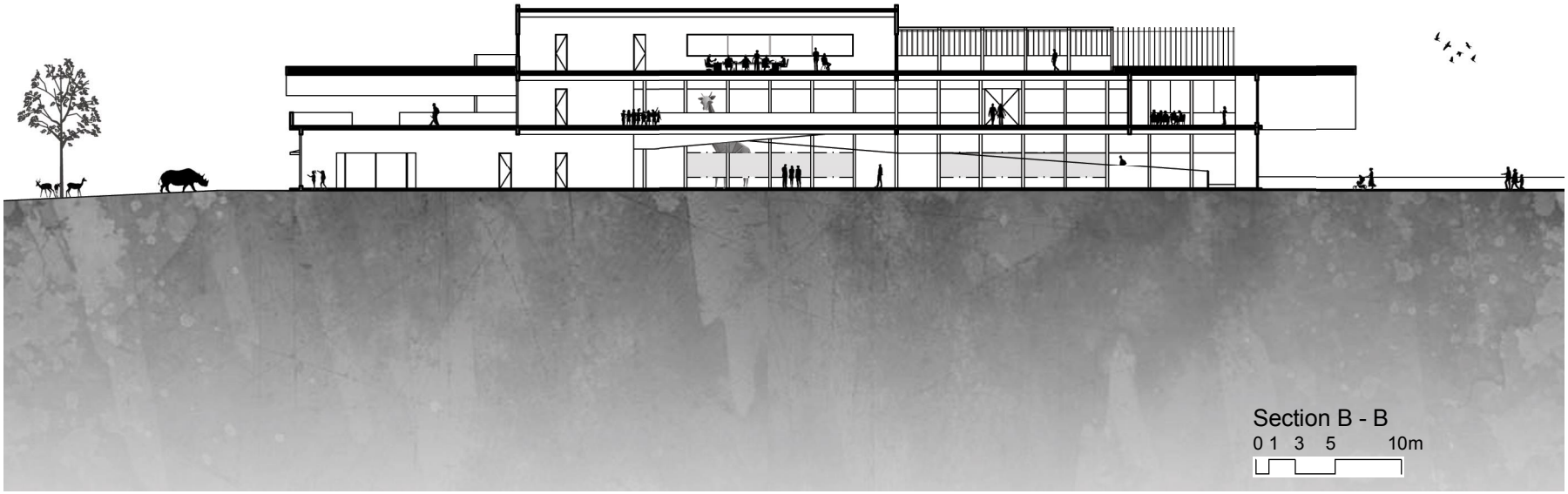
Perspective View: Interpretation Centre Entrance

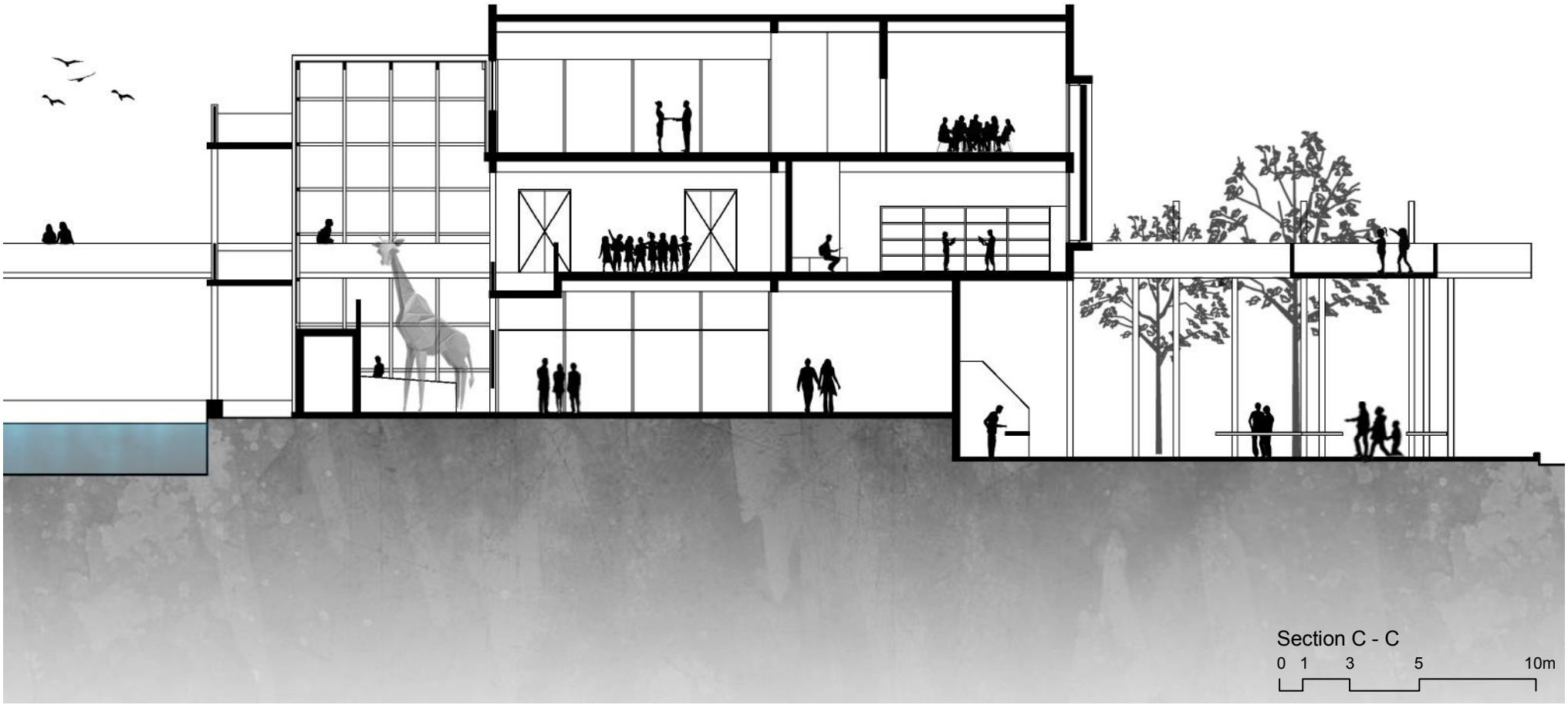

Jan Smuts Avenue
A
B
C
1. Main entrance
2. Conservational Gallery
3. Vertical circulation (lift and stairs)
4. Ramp Gallery – main public circulation
5. Bathrooms
6. Life-size specimen exhibition space
7. Gallery exhibition space
8. Café
9. Trader's market
10. Jan Smuts Avenue drop-off zone
11. Rainwater harvesting
12. Private entrance for second floor offices
13. Wetland
14. Ground level zoo pathway
15. Mixed animal enclosure
Ground Floor Plan
0 1 3 5 10m
N

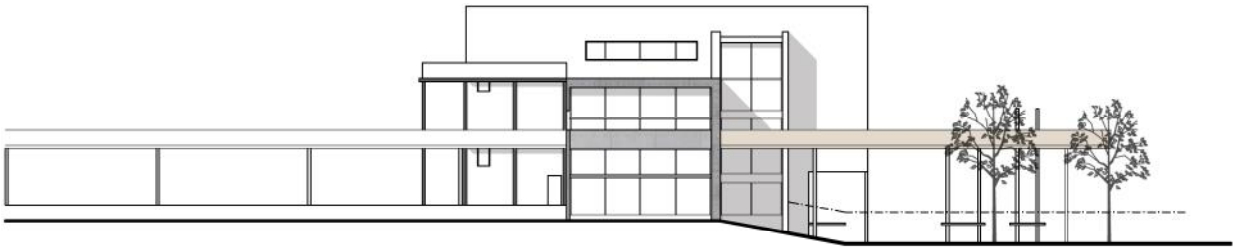

Jan Smuts Avenue
A
B
C
16. Teaching space
17. Circulation ramps
18. Raised walkways into zoo
19. Bathrooms
20. Education centre – animal library
21. Education centre – interactive displays
22. Private entrance for second floor offices
23. Observation deck
24. Traders walkway – NPO income potential
First Floor Plan
0 1 3 5 10m
N


25. Covered entrance to offices
26. Reception
27. Bathrooms
28. Open-plan office space
29. Conference room
30. Observation Balcony
31. Private entrance from ground level
A
B
C
25
26
27
28
29
30
31
Second Floor Plan
0 1 3 5 10m
N


Section A - A
0 1 3 5 10m

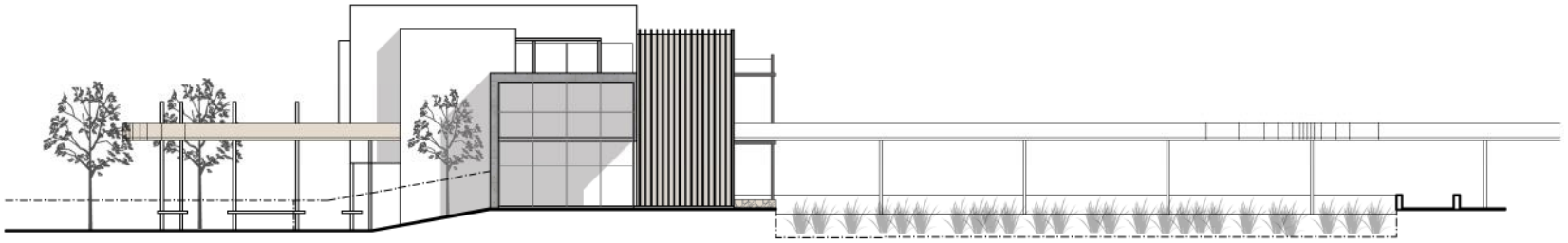

Section B - B
0 1 3 5 10m


Section C - C
0 1 3 5 10m



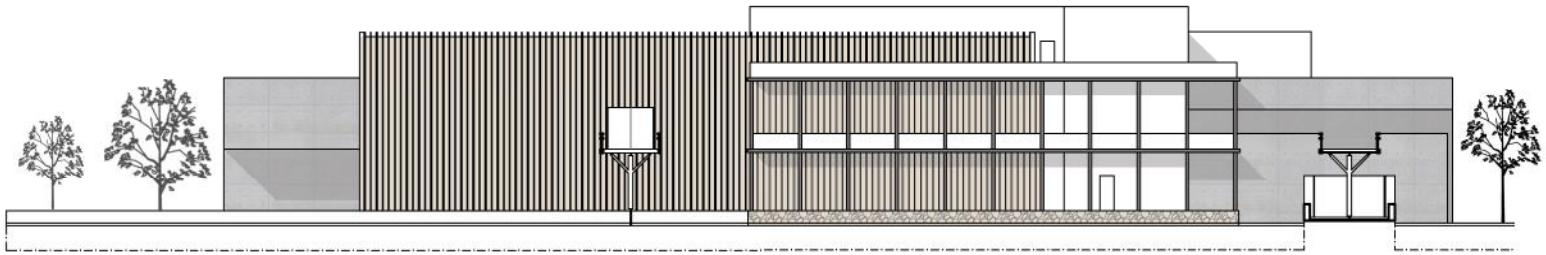
North Elevation

0 1 3 5 10m



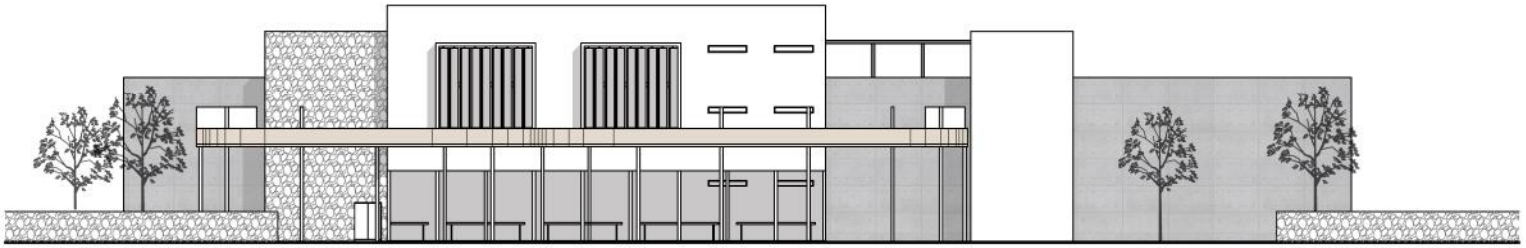
South Elevation

0 1 3 5 10m



East Elevation

0 1 3 5 10m

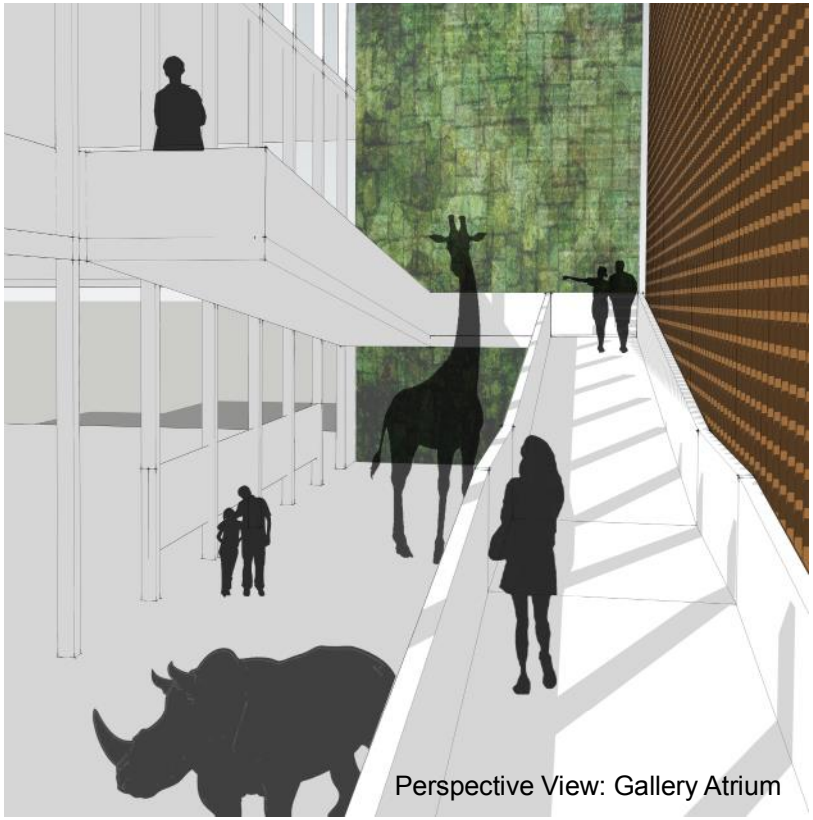


West Elevation

0 1 3 5 10m

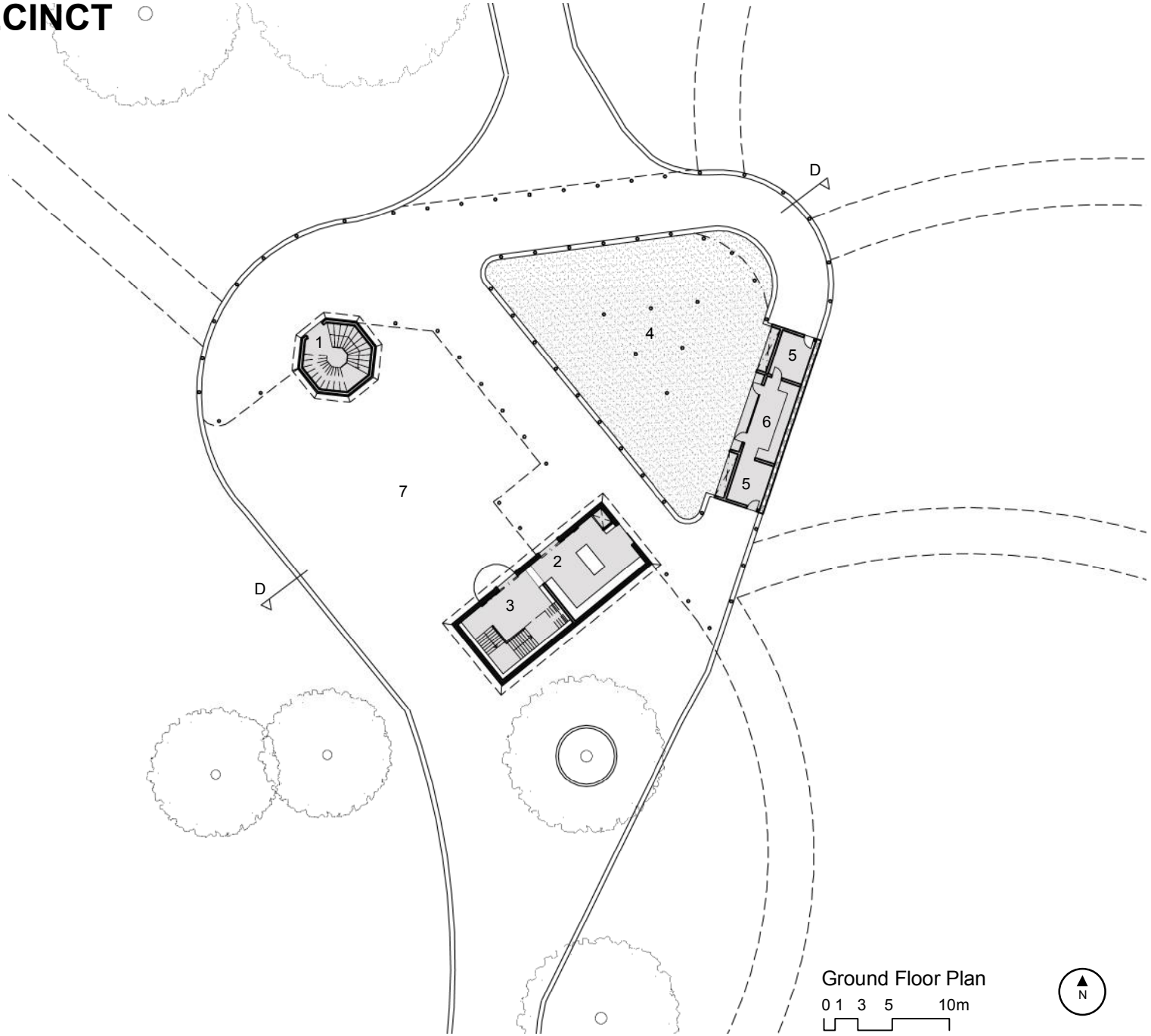


Perspective View: Trade Interface

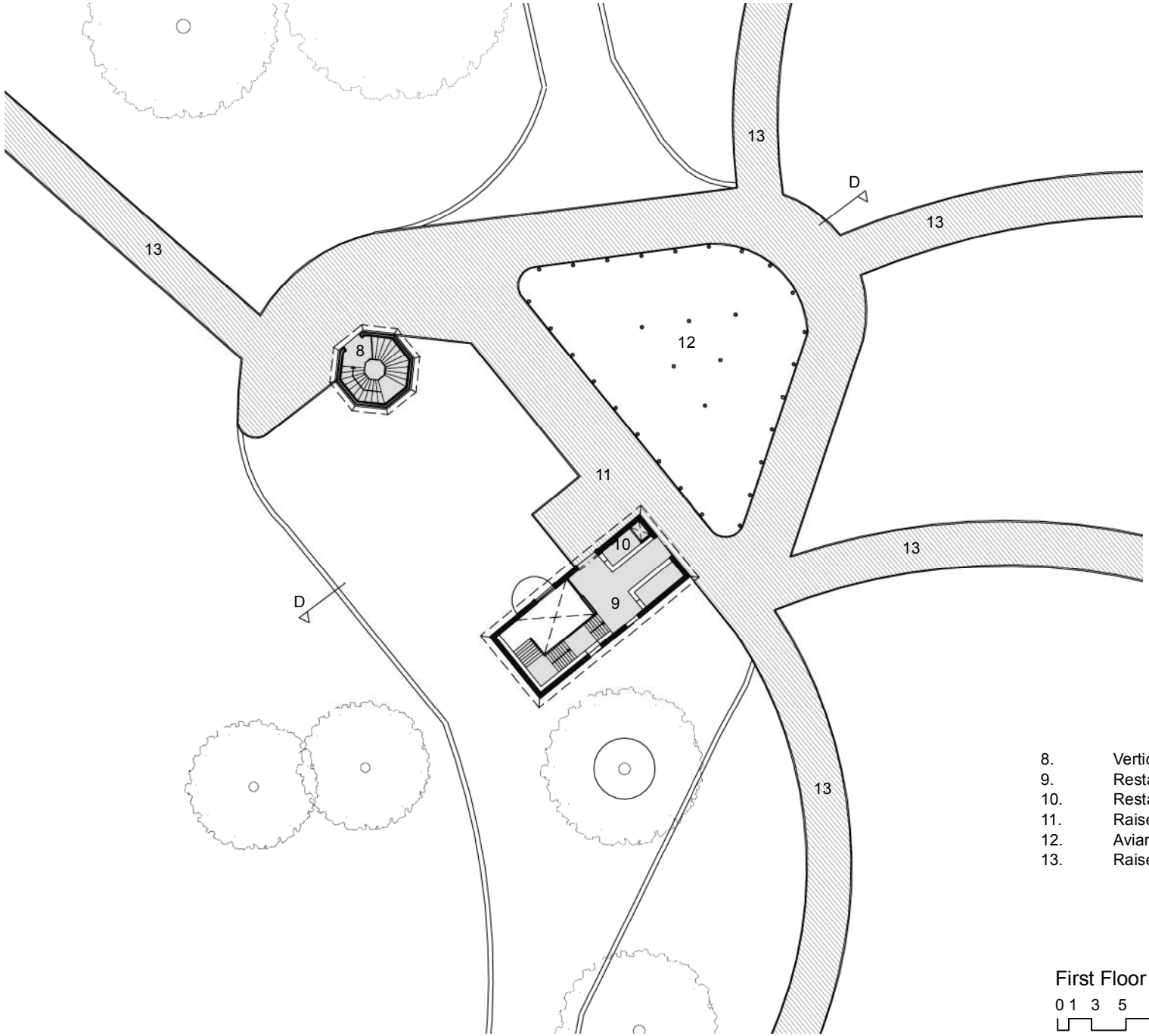


Perspective View: Gallery Atrium

GIRAFFE HOUSE PRECINCT



1. Vertical circulation (giraffe house 1)
2. Restaurant Kitchen (giraffe house 2)
3. Curio shop and circulation
4. Aviary enclosure
5. Bird handler's access
6. Treatment room
7. Public plaza

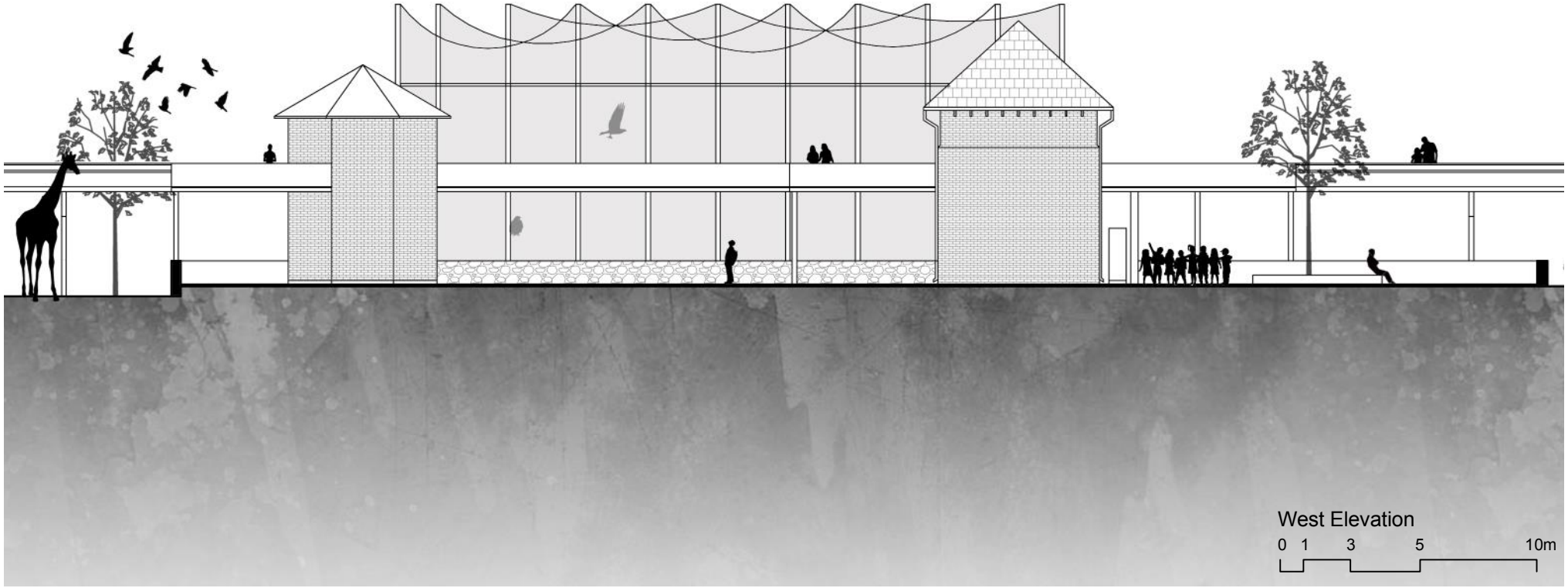


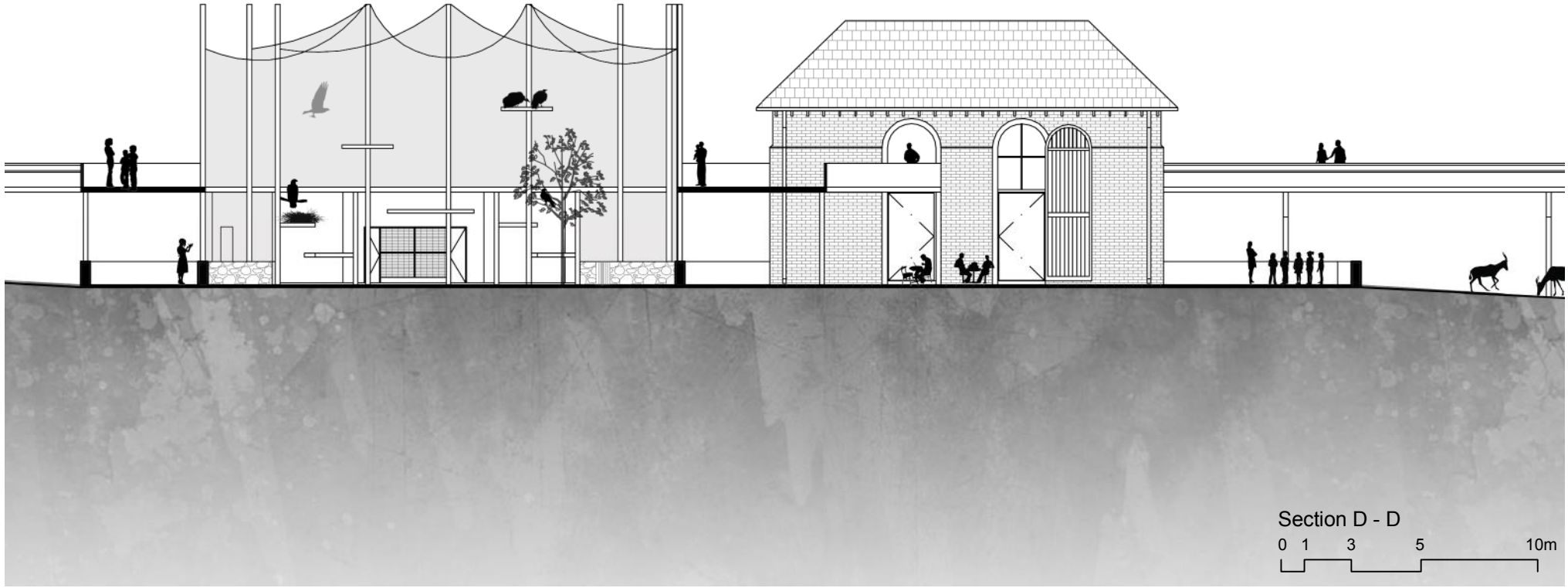
8. Vertical circulation (giraffe house 1)
9. Restaurant customer interface (giraffe house 2)
10. Restaurant service – with food lift from below
11. Raised observation deck
12. Aviary enclosure
13. Raise walkways into zoo grounds

First Floor Plan

0 1 3 5 10m

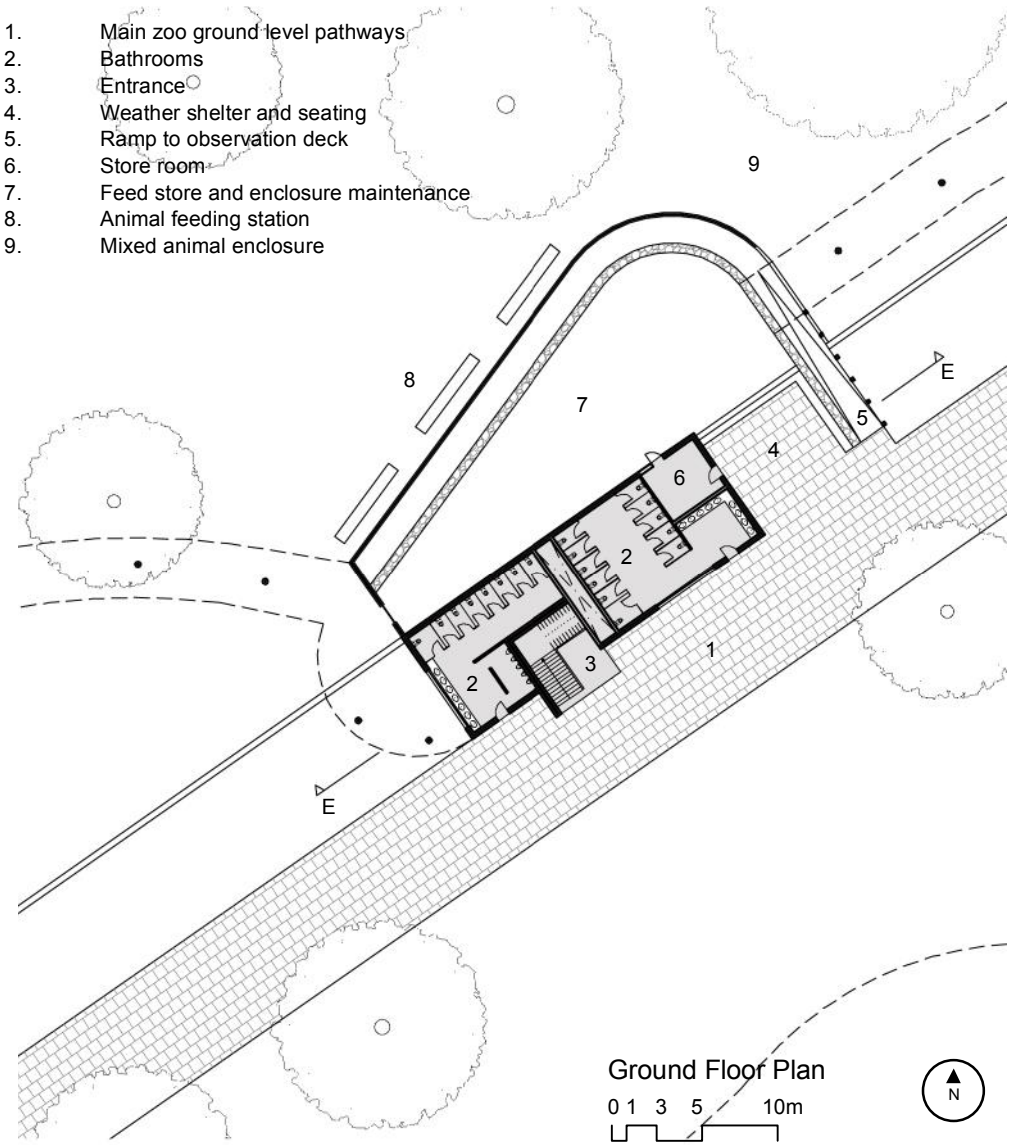
N


West Elevation
0 1 3 5 10m


Section D - D
0 1 3 5 10m

REFRESHMENT STATIONS

1. Main zoo ground level pathways
2. Bathrooms
3. Entrance
4. Weather shelter and seating
5. Ramp to observation deck
6. Store room
7. Feed store and enclosure maintenance
8. Animal feeding station
9. Mixed animal enclosure

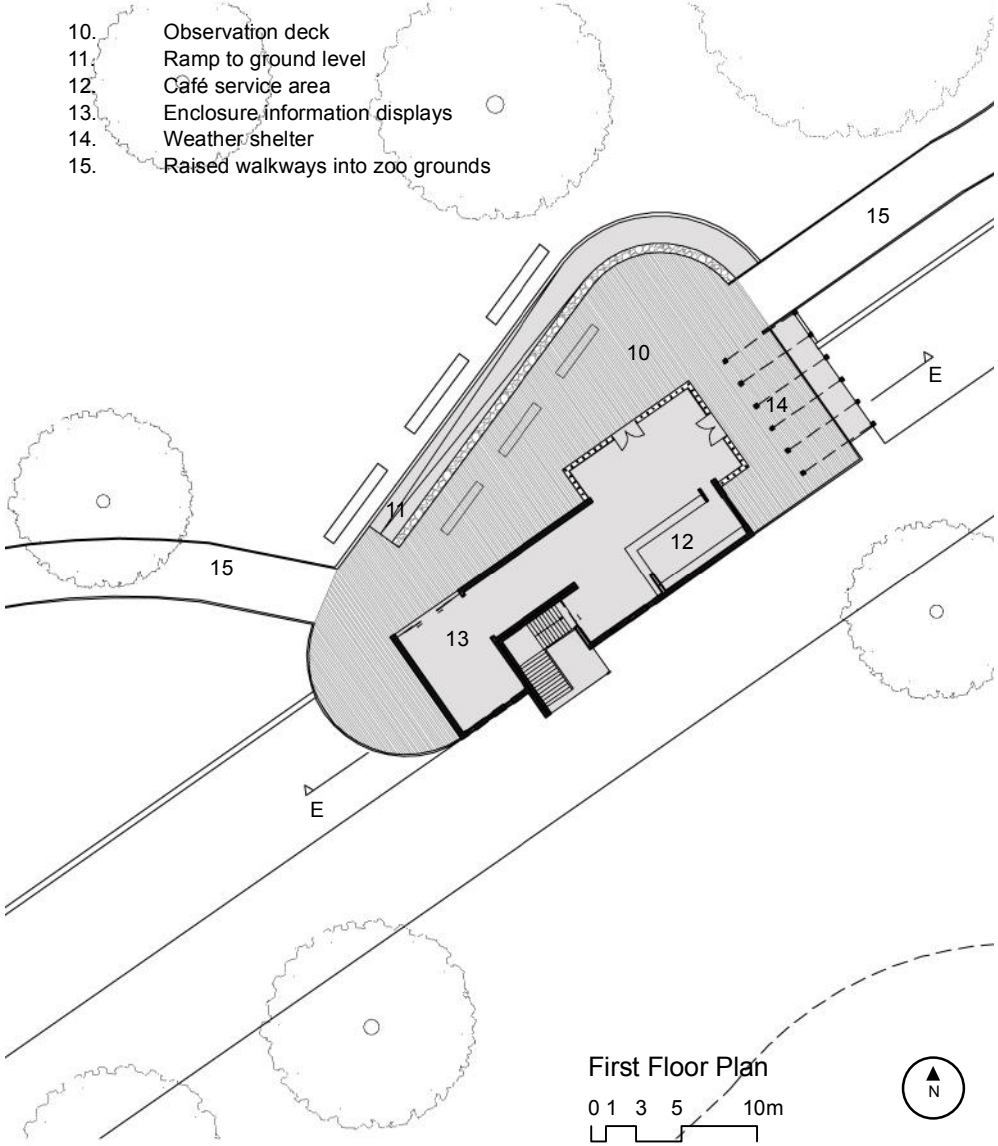


Ground Floor Plan

0 1 3 5 10m

N

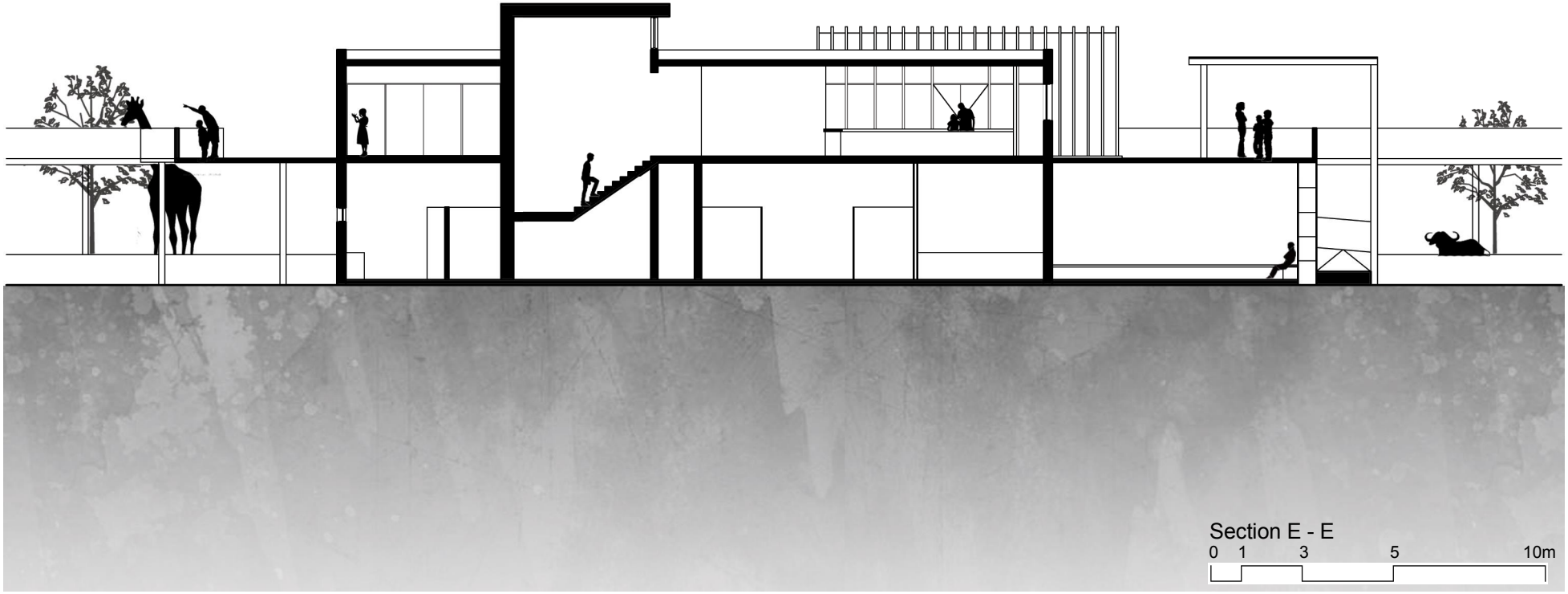
10. Observation deck
11. Ramp to ground level
12. Café service area
13. Enclosure information displays
14. Weather shelter
15. Raised walkways into zoo grounds

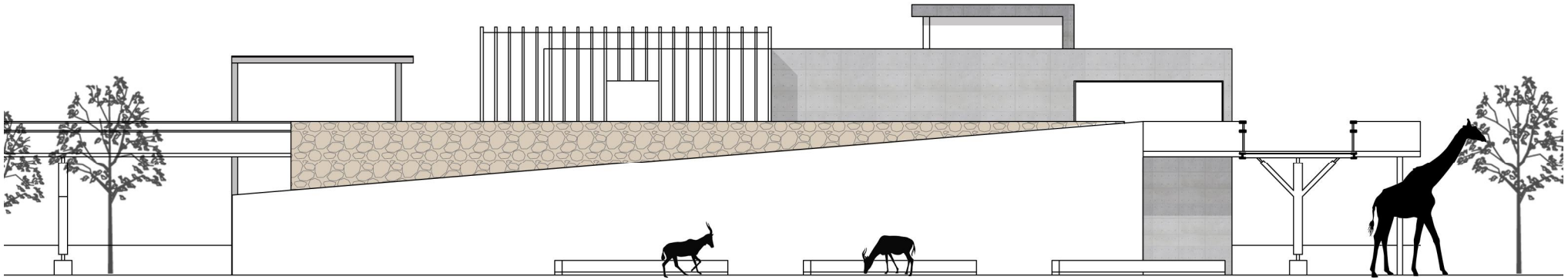


First Floor Plan

0 1 3 5 10m

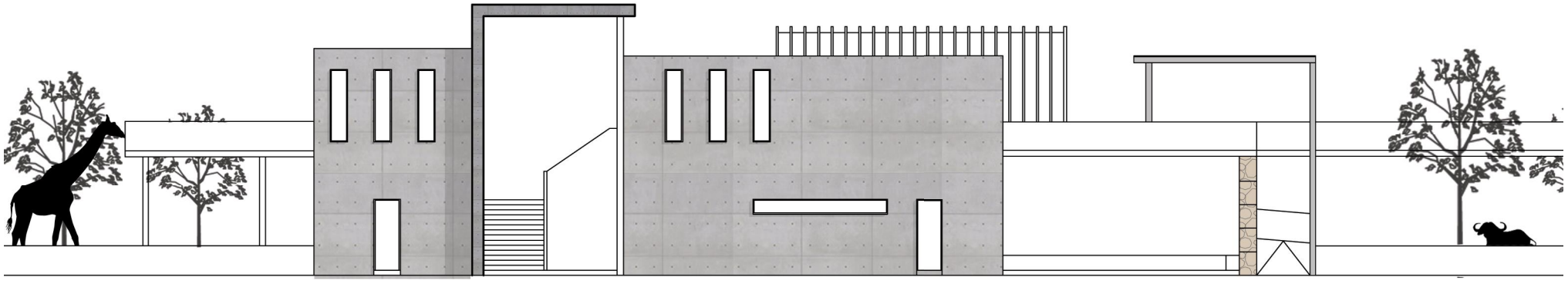
N


Section E - E
0 1 3 5 10m



North Elevation

0 1 3 5 10m



South Elevation

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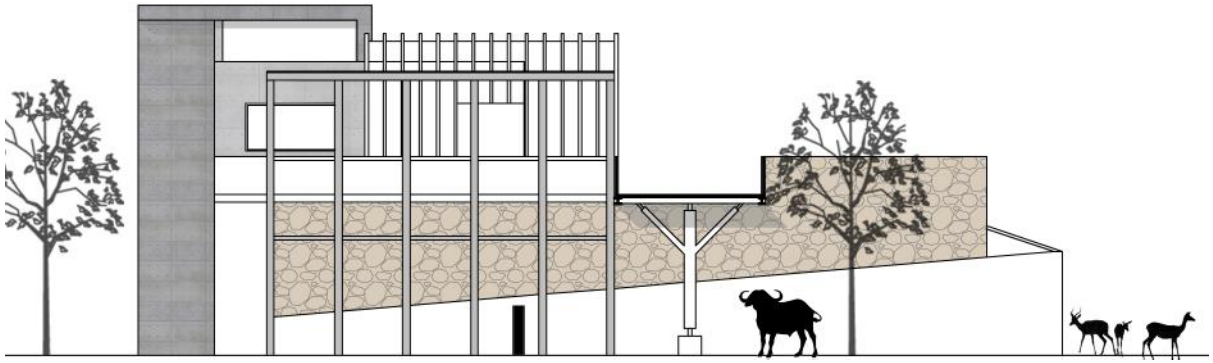

East Elevation

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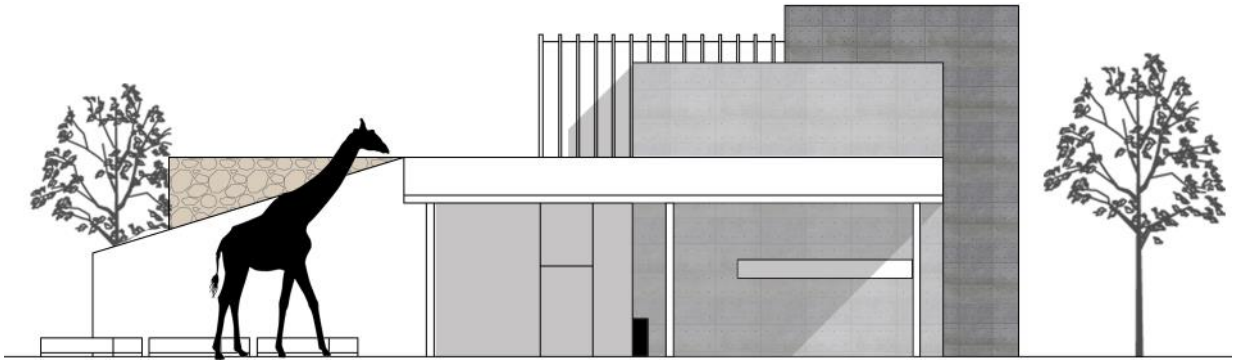


West Elevation

0 1 3 5 10m



Perspective View: Observation Deck

MODELS

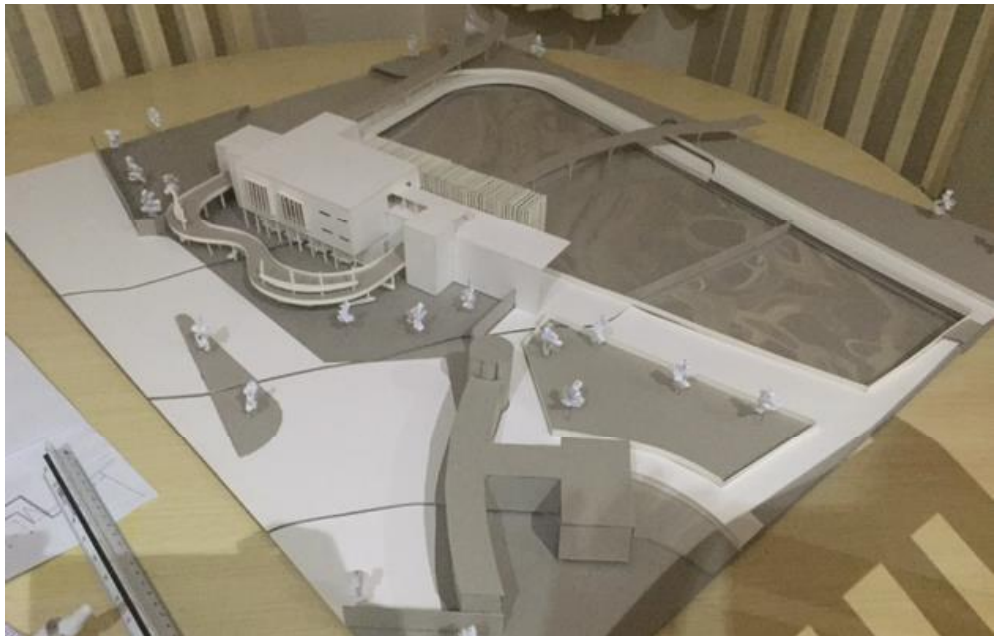
Clockwise Direction

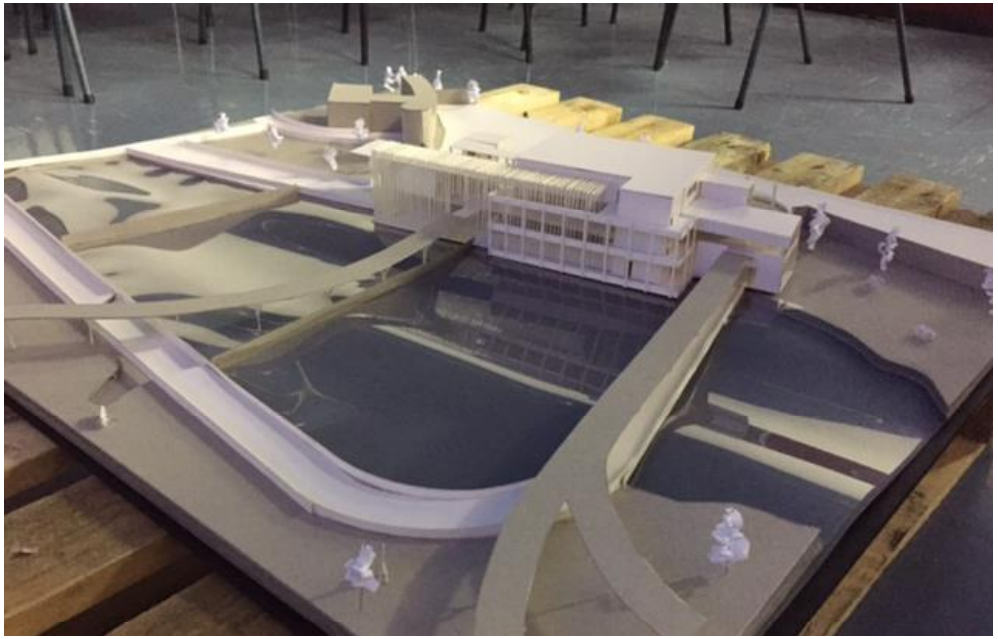
Site Model scale 1:1000

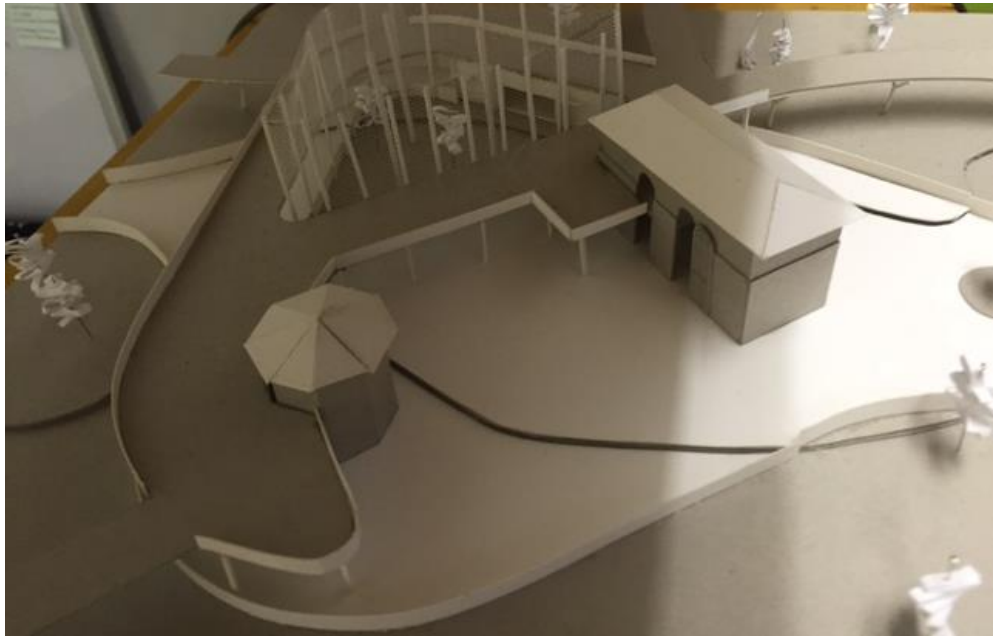
Interpretation Centre scale 1:200

Giraffe House Precinct scale 1:200











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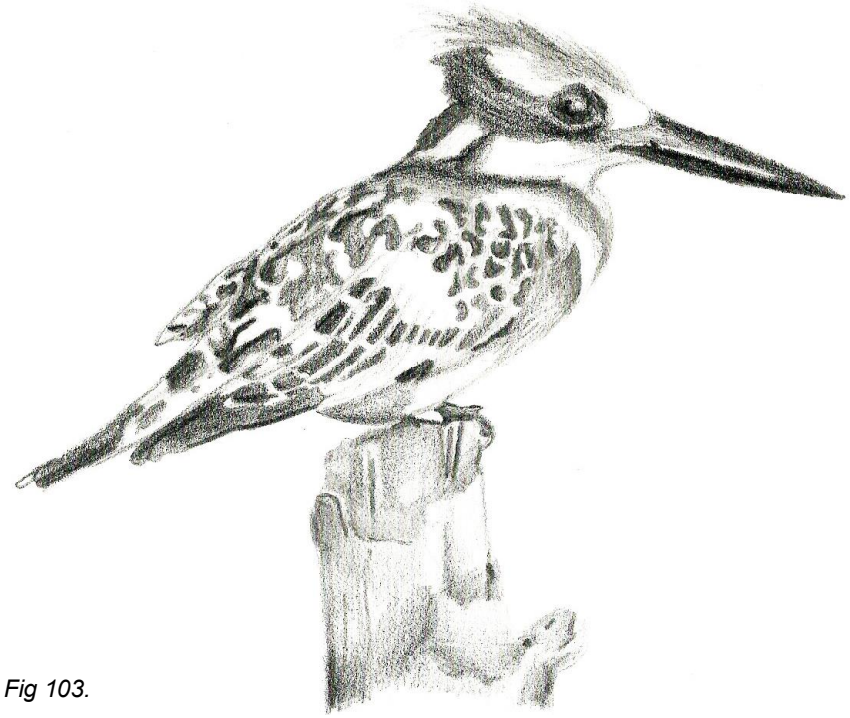

Fig 103.

ACKNOWLEDGMENTS

Thank-you to everyone who has helped in the making of this thesis:

To my supervisor, Diaan Van Der Westhuizen, for your hours of guidance and insight through the ups and downs of the creative process. To the staff at Johannesburg Zoo and Johannesburg Heritage Association, who all so willingly answered my expanse of questions.

To the incredible friends that I have made along the way - a long walk is made bearable through companionship, your understanding and laughter have really lightened the load. And to my parents for your never-ending support and encouragement throughout my studies - this journey would not have been possible without you.